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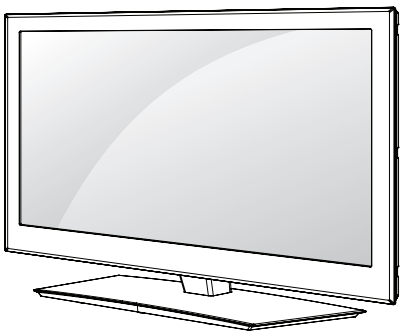
LED LCD TV
SERVICE MANUAL

CHASSIS : LD12D

MODEL: 55LW980S 55LW980S-ZA

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL67002340 (1108-REV00)

Printed in Korea

CONTENTS

SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

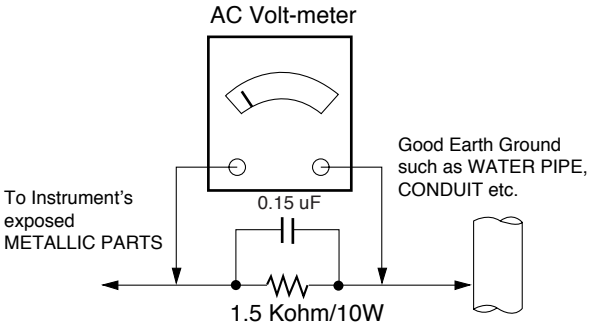
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω
*Base on Adjustment standard

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This specification is applied to the LED LCD TV used LD12D chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

1) Temperature: 25 ºC ± 5 ºC(77 ºF ± 9 ºF), CST: 40 ºC ± 5 ºC
2) Relative Humidity : 65 % ± 10 %
3) Power Voltage
   : Standard input voltage (AC 100-240 V~, 50 / 60 Hz)
   * Standard Voltage of each products is marked by models.
4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

1) Performance: LGE TV test method followed
2) Demanded other specification
   - Safety : CE, IEC specification
   - EMC :CE, IEC

4. Model General Specification

No.	Item	Specification	Remarks
1	Market	EU(PAL Market-36Countries)	**DTV & Analog (Total 36 countries)** **DTV (MPEG2/4, DVB-T) :** 31 countries (England/Italy/Germany/France/Spain/Sweden/Finland/Netherlands/Belgium/Luxemburg/ Greece/Denmark/Czech/Austria/Hungary/Swiss/Croatia/Turkey/Norway/Slovenia/Poland/ Ukraine/Portugal/Ireland/Morocco/Latvia/Estonia/Lithuania/Rumania/Russia/Slovakia) **DTV (MPEG2/4, DVB-T2): 6 countries** (England/Denmark/Sweden/Finland/Norway/Ireland) **DTV (MPEG2/4, DVB-C): 14 countries** Slovenia/Poland/Hungary/Swiss/Austria/France/Sweden/Netherlands/Denmark/Germany/ Finland/Norway/Ukraine/Russia **DTV (MPEG2/4,DVB-S): 33 countries** Albania/Austria/Belgium/Bosnia/Bulgaria/Croatia/Czech/Estonia/France/Germany/Greece/ Hungary/Ireland/Italy/Kazakhstan/Latvia/Lithuania/Luxembourg/Morocco/Netherlands/Poland/ Portugal/Romania/Russia/Serbia/Slovenia/Spain/Slovakia/Switzerland/Turkey/Ukraine/ Norway/Benelux **Analog Only - 5 countries** (Bosnia/Serbia/Bulgaria/Albania/Kazakhstan) **Supported satellite : 22 satellites** HISPASAT 1C/1D, ATLANTIC BIRD 2, NILESAT 101/102, ATLANTIC BIRD 3, AMOS 2/3, THOR 5/6, IRIUS 4, EUTELSAT-W3A, EUROBIRD 9A, EUTELSAT-W2A, HOTBIRD 6/8/9, EUTELSAT-SESAT, ASTRA 1L/H/M/KR, ASTRA 3A/3B, BADR 4/6, ASTRA 2D, EUROBIRD 3, EUTELSAT-W7, HELLASSAT 2, EXPRESS AM1, TURKSAT 2A/3A, INTERSAT10
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L', DK, BG, I 5) DVB-T 6) DVB-C 7) DVB-T2 8) DVB-S	 DVB-S :Satellite

No.	Item	Specification	Remarks
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM , QAM	▶ **DVB-T** - Guard Interval(Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32 - Modulation : Code Rate QPSK : 1/2, 2/3, 3/4, 5/6, 7/8 16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 ▶ **DVB-T2** - Guard Interval(Bitrate_Mbit/s) 1/4,1/8,1/16,1/32,1/128,19/128,19/256, - Modulation : Code Rate QPSK : 1/2, 2/5, 2/3, 3/4, 5/6 16-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 64-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 256-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 ▶ **DVB-C** - SymbolRate : 4.0Msymbols/s to 7.2Msymbols/s - Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM ▶ **DVB-S** - SymbolRate DVB-S2 (8PSK/ QPSK) : 2 ~ 45 Msymbol/s DVB-S (QPSK) : 2~ 45 Msymbol/s - viterbi DVB-S mode :1/2, 2/3, 3/4, 5/6, 7/8 DVB-S2 mode : 1/2, 23, 3/4, 3/5, 4/5, 5/6, 8/9, 9/10
4	Scart Gender Jack(1EA)	PAL, SECAM	Scart Jack is Full scart and support MNT/DTV-OUT(not support DTV Auto AV)
5	Video Input RCA(2EA)	PAL, SECAM, NTSC	System : PAL, SECAM, NTSC, PAL60 Rear 1EA, AV gender jack 1EA
6	Head phone out	Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, HDMI4, USB	
7	Component Input(1EA)	Y/Cb/Cr, Y/Pb/Pr	Component Gender 1EA
8	RGB Input	RGB-PC	Analog(D-SUB 15PIN)
9	HDMI Input (4EA)	HDMI1-DTV/DVI HDMI2-DTV HDMI3-DTV HDMI4-DTV	PC(HDMI version 1.3) Support HDCP
10	Audio Input (4EA)	RGB/DVI Audio, Component, AV1, 2	L/R Input
11	SDPIF out (1EA)	SPDIF out	
12	USB (2EA)	EMF, DivX HD, For SVC(download)	JPEG, MP3, DivX HD

5. Component Video Input (Y, C_B/P_B, C_R/P_R)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	720x480	15.73	60.00	SDTV,DVD 480i	
2.	720x480	15.63	59.94	SDTV,DVD 480i	
3.	720x480	31.47	59.94	480p	
4.	720x480	31.50	60.00	480p	
5.	720x576	15.625	50.00	SDTV,DVD 625 Line	
6.	720x576	31.25	50.00	SDTV 576p	
7.	1280x720	45.00	50.00	HDTV 720p	
8.	1280x720	44.96	59.94	HDTV 720p	
9.	1280x720	45.00	60.00	HDTV 720p	
10.	1920x1080	31.25	50.00	HDTV 1080i	
11.	1920x1080	33.75	60.00	HDTV 1080i	
12.	1920x1080	33.72	59.94	HDTV 1080i	
13.	1920x1080	56.250	50	HDTV 1080p	
14.	1920x1080	67.5	60	HDTV 1080p	

6. RGB (PC)

No.	Specification				Proposed	Remarks
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel Clock(MHz)		
1.	720*400	31.468	70.08	28.321		For only DOS mode
2.	640*480	31.469	59.94	25.17	VESA	Input 848*480 60 Hz, 852*480 60 Hz -> 640*480 60 Hz Display
3.	800*600	37.879	60.31	40.00	VESA	
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	
5.	1360*768	47.72	59.8	84.75	WXGA	
6.	1920*1080	66.587	59.93	138.625	WUXGA	FHD model

7. HDMI Input

(1) DTV Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*480	31.469/31.5	59.94/60	27.00/27.03	SDTV 480P	
2.	720*576	31.25	50	54	SDTV 576P	
3.	1280*720	37.500	50	74.25	HDTV 720P	
4.	1280*720	44.96/45	59.94 /60	74.17/74.25	HDTV 720P	
5.	1920*1080	33.72/33.75	59.94 /60	74.17/74.25	HDTV 1080I	
6.	1920*1080	28.125	50.00	74.25	HDTV 1080I	
7.	1920*1080	26.97/27	23.97/24	74.17/74.25	HDTV 1080P	
8.	1920*1080	33.716/33.75	29.976 /30.00	74.25	HDTV 1080P	
9.	1920*1080	56.250	50	148.5	HDTV 1080P	
10.	1920*1080	67.43/67.5	59.94 /60	148.35/148.50	HDTV 1080P	

(2) PC Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*400	31.468	70.08	28.321		HDCP
2.	640*480	31.469	59.94	25.17	VESA	HDCP
3.	800*600	37.879	60.31	40.00	VESA	HDCP
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	HDCP
5.	1360*768	47.72	59.8	84.75	WXGA	HDCP
6.	1920*1080	67.5	60.0	138.625	WUXGA	HDCP/FHD model

8. 3D Mode

(1) HDMI Input

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	53.95/54	23.98/24	148.35/148.5	HDTV 1080P	HDMI 3D Frame packing
2	1280*720	89.9/90	59.94/60	148.35/148.5	HDTV 720P	HDMI 3D Frame packing
3	1280*720	75	50	148.5	HDTV 720P	HDMI 3D Frame packing
4	1920*1080	67.5	60	148.5	HDTV 1080P	Side by Side(half), Top and bottom Checkerboard, Single Frame Sequential
5	1920*1080	56.25	50	148.5	HDTV 1080P	Side by Side(half), Top and bottom Checkerboard, Single Frame Sequential
6	1280*720	45	60	74.25	HDTV 720P	Side by Side(half), Top and Bottom HDMI 3D Top and Bottom
7	1280*720	37.5	50	74.25	HDTV 720P	Side by Side(half), Top and Bottom HDMI 3D Top and Bottom
8	1920*1080	33.75	60	74.25	HDTV 1080i	Side by Side(half), Top and Bottom HDMI 3D Top and Bottom
9	1920*1080	28.125	50	74.25	HDTV 1080i	Side by Side(half), Top and Bottom HDMI 3D Top and Bottom
10	1920*1080	27	24	74.25	HDTV 1080P	Side by Side(half), Top and Bottom, Checkerboard, HDMI 3D Top and Bottom
11	1920*1080	33.75	30	89.1	HDTV 1080P	Side by Side(half), Top and Bottom, Checkerboard
12	1920*1080	67.5	30	74.25	HDTV 1080P	HDMI 3D Frame packing

(3) RF 3D Input(DTV)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	37.500	50	74.25	HDTV 720P	Side by Side, Top & Bottom
2	1920*1080	28.125	50	74.25	HDTV 1080I	Side by Side, Top & Bottom

(4) DLNA

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	33.75	30	74.25	HDTV 1080P	Side by Side, Top & Bottom, Checkerboard

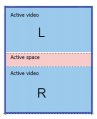
(5) USB Input

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30.000	74.25	Side by Side Top & Bottom Checkerboard MPO(photo)	HDTV 1080P

(6) RGB Input

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	66.587	59.934	74.25	HDTV 1080P	Side by Side, Top & Bottom

(7) 3D Input mode

No.	Side by Side	Top & Bottom	Checkerboard	Single Frame Sequential	Frame Packing	2D to 3D
1.						

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LED LCD TV with LD12D chassis.

2. Designation

(1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
(2) Adjustment must be done in the correct order.
(3) The adjustment must be performed in the circumstance of 25 ºC ± 5 ºC of temperature and 65 % ± 10 % of relative humidity if there is no specific designation.
(4) The input voltage of the receiver must keep AC 100-240 V~, 50 / 60Hz.
(5) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15.

In case of keeping module is in the circumstance of 0 °C, it should be placed in the circumstance of above 15 °C for 2 hours

In case of keeping module is in the circumstance of below -20 °C, it should be placed in the circumstance of above 15 °C for 3 hours.

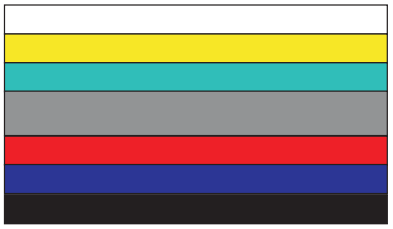
[Caution]
When still image is displayed for a period of 20 minutes or longer (especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area.

3. Automatic Adjustment

3.1. ADC Adjustment

(1) Overview
ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.
* If Adjust ADC is “OTP”, It doesn’t need ADC adjustment. (GP3-BCM)

(2) Equipment & Condition
1) Jig (RS-232C protocol)
2) MSPG-925 Series Pattern Generator(MSPG-925FA, pattern - 65)
- Resolution : 480i Comp1
1080P Comp1
1920*1080 RGB
- Pattern : Horizontal 100% Color Bar Pattern
- Pattern level : 0.7 ± 0.1 Vp-p
- Image



(3) Adjustment
1) Adjustment method
- Using RS-232, adjust items in the other shown in “3.1.(3).3)”

2) Adj. protocol

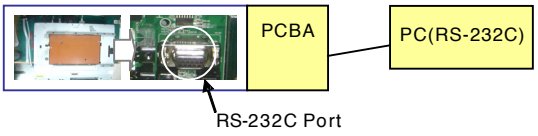
Protocol	Command	Set ACK
Enter adj. mode	aa 00 00	a 00 OK00x
Source change	xb 00 40	b 00 OK40x (Adjust 480i, 1080p Comp1)
	xb 00 60	b 00 OK60x (Adjust 1920*1080 RGB)
Begin adj.	ad 00 10	
Return adj. result		OKx (Case of Success)
		NGx (Case of Fail)
Read adj. data	(main)	(main)
	ad 00 20	00000000000000000000000007c007b006dx
	(sub)	(Sub)
	ad 00 21	00000007000000000000000007c00830077x
Confirm adj.	ad 00 99	NG 03 00x (Fail)
		NG 03 01x (Fail)
		NG 03 02x (Fail)
		OK 03 03x (Success)
End adj.	aa 00 90	a 00 OK90x

Ref.) ADC Adj. RS232C Protocol_Ver1.0

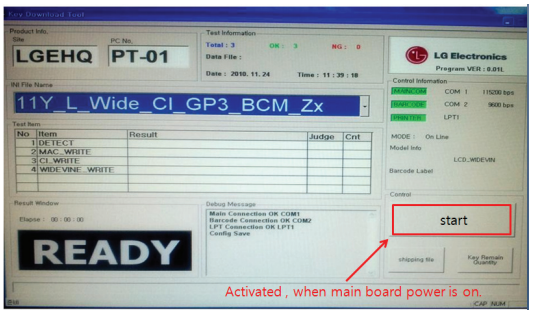
3) Adj. order
- aa 00 00 [Enter ADC adj. mode]
- xb 00 04 [Change input source to Component1(480i&1080p)]
- ad 00 10 [Adjust 480i Comp1]
- xb 00 06 [Change input source to RGB(1024*768)]
- ad 00 10 [Adjust 1024*768 RGB]
- ad 00 90 End adj.

3.2. MAC address/ CI+ key, Widevine key D/L

Connect: PCBA Jig-> RS-232C Port== PC-> RS-232C Port Communication Port connection



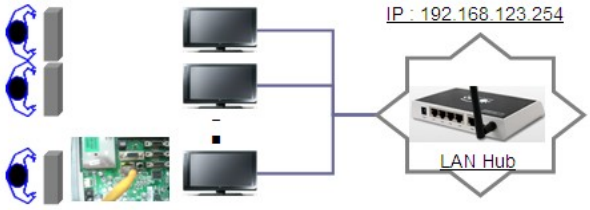
■ Com 1,2,3,4 and 115200(Baud rate)
Mode check : Online Only
■ Check the test process: DETECT -> MAC -> CI -> Widevine
■ Play : START
■ Result : Ready, Test, OK or NG
■ Printer Out(MAC Address Label)



3.3. LAN Inspection

(1) Equipment & Condition

■ Each other connection to LAN Port of IP Hub and Jig



(2) LAN inspection solution

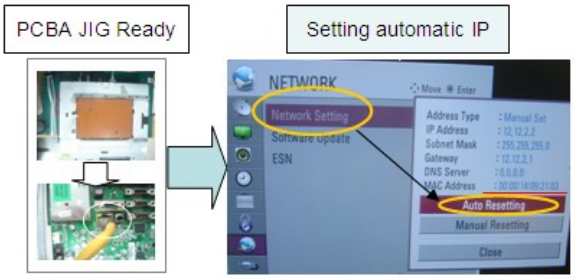
■ LAN Port connection with PCB

■ Network setting at MENU Mode of TV

■ setting automatic IP

■ Setting state confirmation

-> If automatic setting is finished, you confirm IP and MAC Address.



3.4. Widevine Key Inspection

Widevine key Inspection

- Confirm key input Data at the “IN START” MENU Mode.

3.5. LAN PORT INSPECTION(PING TEST)

Connect SET -> LAN port == PC -> LAN Port

SET —— PC

(1) Equipment setting

1) Play the LAN Port Test PROGRAM.

2) Input IP set up for an inspection to Test Program.

*IP Number : 12.12.2.2

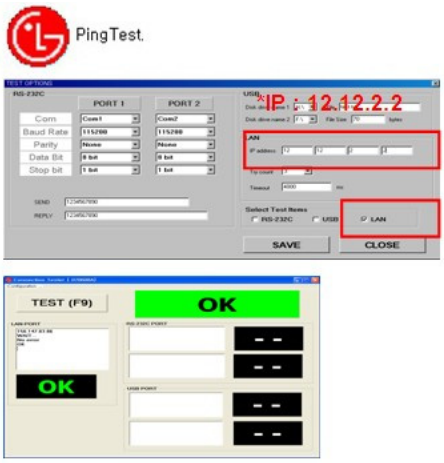
(2) LAN PORT inspection (PING TEST)

1) Play the LAN Port Test Program.

2) Connect each other LAN Port Jack.

3) Play Test (F9) button and confirm OK Message.

4) Remove LAN cable.



3.6. Model name & Serial number Download

(1) Model name & Serial number D/L

■ Press “Power on” key of service remote control. (Baud rate : 115200 bps)

■ Connect RS232 Signal Cable to RS-232 Jack.

■ Write Serial number by use RS-232.

■ Must check the serial number at Instart menu.

(2) Method & notice

A. Serial number D/L is using of scan equipment.

B. Setting of scan equipment operated by Manufacturing Technology Group.

C. Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

* Manual Download (Model Name and Serial Number)

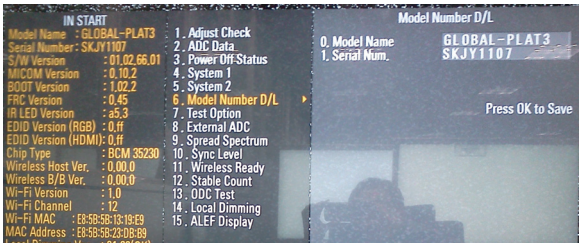
If the TV set is downloaded by OTA or service man, sometimes model name or serial number is initialized.(Not always)

There is impossible to download by bar code scan, so It need Manual download.

a. Press the ‘instart’ key of ADJ remote control.

b. Go to the menu ‘5.Model Number D/L’ like below photo.

c. Input the Factory model name(ex 42LW950-ZA) or Serial number like photo.



d. Check the model name Instart menu. -> Factory name displayed. (ex 42LW750S-ZA)

e. Check the Diagnostics. (DTV country only) -> Buyer model displayed. (ex 42LW750S-ZA)

3.7. CI+ Key checking method

Check whether the key was downloaded or not at 'In Start' menu. (Refer to below).

=> Check the Download to CI+ key value in LGset.

3.7.1. Check the method of CI+ Key value

(1) Check the method on Instart menu.

(2) Check the method of RS232C Command.

1) Into the main assembly mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

2) Check the key download for transmitted command. (RS232 : ci 00 10)

CMD 1	CMD 2	Data 0	
C	I	1	0

3) Result value

- Normally status for download : OKx
- Abnormally status for download : NGx

3.7.2. Check the method of CI+ Key value (RS232)

1) Into the main assembly mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

2) Check the method of CI+ key by command (RS232 : ci 00 20)

CMD 1	CMD 2	Data 0	
C	I	2	0

3) Result value

i 01 OK 1d1852d21c1ed5dcx

→ CI+ key Value

3.8. WIFI MAC ADDRESS CHECK

(1) Using RS232

	H-freq(kHz)	V-freq.(Hz)
Transmission	[A][I][ ][Set ID][ ][20][Cr]	[O][K][X] or [NG]

(2) Check the menu on in-start.

4. Manual Adjustment

4.1. ADC Adjustment

ADC adjustment is not needed because of OTP.(Auto ADC adjustment)

4.2. EDID(The Extended Display Identification Data)/DDC(Display Data Channel) download

(1) Overview

It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

(2) Equipment

- Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.
- Adjust remote control

(3) Download method

1) Press ADJ key on the Adjustment remote control, then select "12.EDID D/L", By pressing Enter key, enter EDID D/L menu.

2) Select [Start] button by pressing Enter key, HDMI1/ HDMI2/ HDMI3/ HDMI4/ RGB are Writing and display OK or NG.

(4) EDID DATA

■ HDMI

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	ⓐ		ⓑ			
0x01	ⓒ		01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	40	81	C0	81	0	81	80	95	0
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
0x06	3F	1F	52	10	00	0A	20	20	20	20	20	20	ⓓ			
0x07	ⓓ														01	ⓔ1
0x00	02	03	37	F1	4E	10	1F	84	13	05	14	03	02	12	20	21
0x01	22	15	01	26	15	07	50	09	57	07	ⓕ					
0x02	ⓕ															
0x03	ⓕ			E3	05	03	01	01	1D	80	18	71	1C	16	20	58
0x04	2C	25	00	A0	5A	00	00	00	9E	01	1D	00	80	51	D0	1A
0x05	20	6E	88	55	00	A0	5A	00	00	00	1A	02	3A	80	18	71
0x06	38	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	00	00	00
0x07	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	ⓔ2

■ RGB

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	0	FF	FF	FF	FF	FF	FF	0	1E	6D	ⓐ		ⓑ			
0x01	ⓒ		01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	ⓓ			
0x07	ⓓ														0	ⓔ3

■ Reference
- HDMI1 ~ HDMI4 / RGB
- In the data of EDID, bellows may be different by S/W or Input mode.

ⓐ Product ID

Model Name	HEX	EDID Table	DDC Function
ALL	0001	0100	Analog
	0001	0100	Digital

ⓑ Serial No. : Controlled on product line

ⓒ Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
Year : '2011' -> '15'

ⓓ Model Name(Hex): LGTV

MODEL	MODEL NAME(HEX)
all	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20 20

ⓔ Checksum: Changeable by total EDID data.

INPUT	ⓔ1	ⓔ2	ⓔ3
HDMI1	7F	CB	X
HDMI2	7F	BB	X
HDMI3	7F	AB	X
HDMI4	7F	9B	X
RGB	X	X	98

ⓕ Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	78 03 0C 00 10 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI2	78 03 0C 00 20 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI3	78 03 0C 00 30 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI4	78 03 0C 00 40 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI5	78 03 0C 00 50 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10

4.3. White Balance Adjustment

4.3.1 Overview

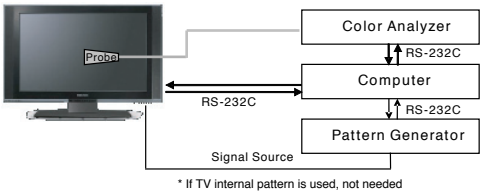
(1) W/B adj. Objective & How-it-works
(2) Objective: To reduce each Panel's W/B deviation
(3) How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
(4) Adj. condition : normal temperature
1) Surrounding Temperature : 25 ºC ± 5 ºC
2) Warm-up time: About 5 Min
3) Surrounding Humidity : 20 % ~ 80 %

4.3.2 Equipment

1) Color Analyzer: CA-210 (LED Module : CH 14)
2) Adj. Computer(During auto adj., RS-232C protocol is needed)
3) Adjust Remote control
4) Video Signal Generator MSPG-925F 720p/216-Gray (Model: 217, Pattern: 78)
-> Only when internal pattern is not available

■ Color Analyzer Matrix should be calibrated using CS-1000

4.3.3. Equipment connection MAP



4.3.4. Adj. Command (Protocol)

<Command Format>

START | 6E | A | 50 | A | LEN | A | 03 | A | CMD | A | 00 | A | VAL | A | CS | A | STOP

- LEN: Number of Data Byte to be sent
- CMD: Command
- VAL: FOS Data value
- CS: Checksum of sent data
- A: Acknowledge

Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

■ RS-232C Command used during auto-adj.

RS-232C COMMAND [CMD	ID	DATA]	Explanation
wb	00	00	Begin White Balance adj.
wb	00	10	Gain adj.(internal white pattern)
wb	00	1f	Gain adj. completed
wb	00	20	Offset adj.(internal white pattern)
wb	00	2f	Offset adj. completed
wb	00	ff	End White Balance adj.(Internal pattern disappears)

Ex) wb 00 00 -> Begin white balance auto-adj.
wb 00 10 -> Gain adj.
ja 00 ff -> Adj. data
jb 00 c0
...
...
wb 00 1f -> Gain adj. completed
*(wb 00 20(Start), wb 00 2f(completed)) -> Off-set adj.
wb 00 ff -> End white balance auto-adj.

■ Adj. Map

	ITEM	Command		Data Range(Hex.)		Default(Decimal)
		Cmd 1	Cmd 2	Min	Max	
Cool	R-Gain	j	g	00	C0	
	G-Gain	j	h	00	C0	
	B-Gain	j	i	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Medium	R-Gain	j	a	00	C0	
	G-Gain	j	b	00	C0	
	B-Gain	j	c	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Warm	R-Gain	j	d	00	C0	
	G-Gain	j	e	00	C0	
	B-Gain	j	f	00	C0	
	R-Cut					
	G-Cut					

4.3.5. Adjustment method

(1) Auto adjustment method

1) Set TV in adj. mode using POWER ON key.
2) Zero calibrate probe then place it on the center of the Display.
3) Connect Cable. (RS-232C)
4) Select mode in adj. Program and begin adjustment.
5) When adjustment is complete (OK Sign), check adj. status pre mode.(Warm, Medium, Cool)
6) Remove probe and RS-232C cable to complete adjustment.

■ W/B Adj. must begin as start command “wb 00 00” , and finish as end command “wb 00 ff”, and Adj. offset if need.

(2) Manual adjustment method

1) Set TV in Adjustment mode using POWER ON.
2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10 cm of the surface.
3) Press ADJ key -> EZ adjust using Adjustment remote control -> 7. White-Balance then press the cursor to the right(►) key.
(When key(►) is pressed 216 Gray internal pattern will be displayed.)
4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

■ If internal pattern is not available, use RF input. In EZ Adj. menu 7.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

■ Adj. condition and cautionary items

1) Lighting condition in surrounding area
Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
2) Probe location : Color Analyzer(CA-210) probe should be within 10 cm and perpendicular of the module surface. (80° ~ 100°)
3) Aging time
- After Aging Start, Keep the Power ON status during 5 Minutes.
- In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

4.3.6. Reference(White Balance Adj. coordinate and temperature)

■ Luminance : 216 Gray

■ Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269	0.273	13000 K	0.0000
MEDIUM	0.285	0.293	9300 K	0.0000
WARM	0.313	0.329	6500 K	0.0000

■ Standard color coordinate and temperature using CA-210 (CH 14)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269 ± 0.002	0.273 ± 0.002	13000 K	0.0000
MEDIUM	0.285 ± 0.002	0.293 ± 0.002	9300 K	0.0000
WARM	0.313 ± 0.002	0.329 ± 0.002	6500 K	0.0000

4.3.7. ALELF & Edge LED White balance table

■ Edge LED module change color coordinate because of aging time.

■ Apply under the color coordinate table, for compensated aging time.

[ALELF]

GP3	Aging Time (Min.)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		269	273	285	293	313	329
1	0-2	285	297	301	317	321	340
2	3-5	284	296	300	316	320	339
3	6-9	283	294	299	314	319	337
4	10-19	282	292	298	312	318	335
5	20-35	279	287	295	307	315	330
6	36-49	275	281	291	301	311	324
7	50-79	273	278	289	298	309	321
8	80-149	271	275	287	295	307	318
9	Over 150	269	273	286	293	305	316

4.4. Wireless function check

Step 1) Connect set and Dongle of Wireless to Cable of HDMI & TTA 20Pin.
Step 2) At OSD of SET, check the message like Fig.3.
Step 3) Detach Cable of Wireless Dongle

Fig.1
<Dongle>

Connect

Fig.2
<Wireless Ready Set>

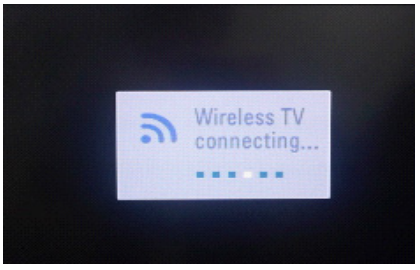
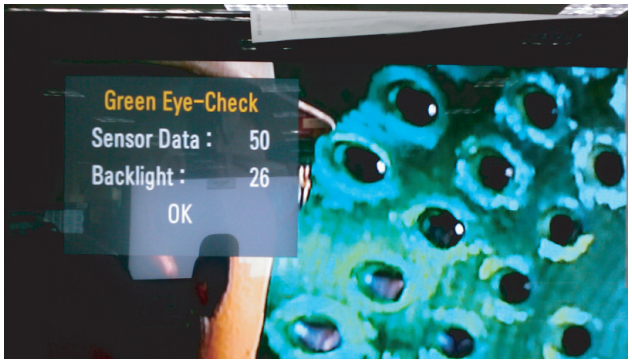


Fig.3 Connect the Dongle
(Dongle Connection Display)

4.5. EYE-Q function check

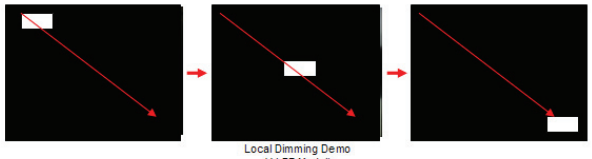
Step 1) Turn on TV.
Step 2) Press EYE key of Adjustment remote control.
Step 3) Cover the Eye Q II sensor on the front of the using your hand and wait for 6 seconds.
Step 4) Confirm that R/G/B value is lower than 10 of the “Raw Data(Sensor data, Back light)”. If after 6 seconds, R/G/B value is not lower than 10, replace Eye Q II sensor.
Step 5) Remove your hand from the Eye Q II sensor and wait for 6 seconds.
Step 6) Confirm that “ok” pop up. If change is not seen, replace Eye Q II sensor.



4.6. Local Dimming Function Check

(1) Turn on TV.
(2) At the Local Dimming mode, module Edge Backlight moving Top to Bottom Back light of IOP module moving.
(3) Confirm the Local Dimming mode.
(4) Press “exit” key


Local Dimming Demo
(Edge LED Model)


Local Dimming Demo
(ALEF Model)

4.7. Magic Motion Remote control test

- Equipment : RF Remote control for test, IR-KEY-Code Remote control for test
- You must confirm the battery power of RF-Remote control before test.(recommend that change the battery per every lot)
- Sequence (test)
  1) if you select the ‘start key(Mute)’ on the controller, you can pairing with the TV SET.
  2) You can check the cursor on the TV Screen, when select the ‘OK’ key on the controller.
  3) You must remove the pairing with the TV Set by select ‘Vol+(STOP)’ key on the controller.

4.8. 3D function test

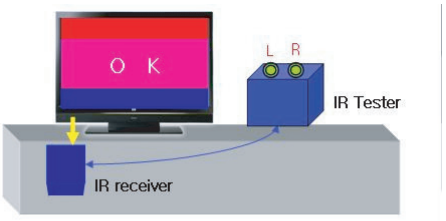
(Pattern Generator MSHG-600, MSPG-6100 [Support HDMI 1.4])
* HDMI mode No. 872, pattern No. 83)
1) Please input 3D test pattern like below.

2) When 3D OSD appear automatically, then select green key.

3) Don’t wear a 3D Glasses, Check the picture like below.

4.9. RF emitter inspection

(1) Start 3D pattern inspection



<IR Emitter inspection>


<IR Tester Lamp turned off(NG)> <IR Tester Lamp turned on(OK)>

(2) If RF emitter signal is correctly received to RF receiver, the lamp of RF tester turn on.

4.10. Option selection per country

(1) Overview
- Option selection is only done for models in Non-EU.
- Applied model: LD12D/N Chassis applied EU model.

(2) Method
1) Press ADJ key on the Adjustment remote control, then select Country Group Menu.
2) Depending on destination, select Country Group Code 04 or Country Group EU then on the lower Country option, select US, CA, MX. Selection is done using +, - or ►◄ KEY.

4.11. Tool Option selection

- Method : Press Adj. key on the Adjustment remote control, then select Tool option.

4.12. Ship-out mode check(In-stop)

After final inspection, press IN-STOP key of the Adjustment remote control and check that the unit goes to Stand-by mode.

5. GND and Internal Pressure check

5.1. Method

1) GND & Internal Pressure auto-check preparation
- Check that Power Cord is fully inserted to the SET. (If loose, re-insert)

2) Perform GND & Internal Pressure auto-check
- Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
- Connect D-terminal to AV JACK TESTER
- Auto CONTROLLER(GWS103-4) ON
- Perform GND TEST
- If NG, Buzzer will sound to inform the operator.
- If OK, changeover to I/P check automatically. (Remove CORD, A/V form AV JACK BOX.)
- Perform I/P test.
- If NG, Buzzer will sound to inform the operator.
- If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

5.2. Checkpoint

• TEST voltage
- GND: 1.5 KV/min at 100 mA
- SIGNAL: 3 KV/min at 100 mA

• TEST time: 1 second

• TEST POINT
- GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
- Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL

• LEAKAGE CURRENT: At 0.5 mArms

6. Audio

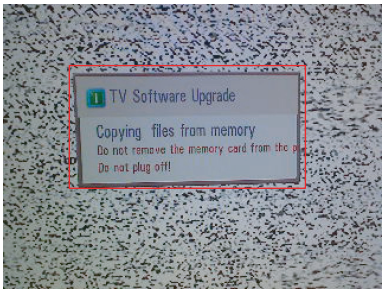
No.	Item	Min.	Typ.	Max.	Unit	
1.	Audio practical max Output, L/R		10	12	W	EQ Off AVL Off
	(Distortion=10 % max Output)		8.9	9.8	Vrms	Clear Voice Off
2.	Speaker (8 Ω Impedance)		10	12	W	EQ On AVL On Clear Voice On

Measurement condition:
1. RF input: Mono, 1 KHz sine wave signal, 100 % Modulation
2. CVBS, Component: 1 KHz sine wave signal 0.4 Vrms
3. RGB PC: 1 KHz sine wave signal 0.7 Vrms

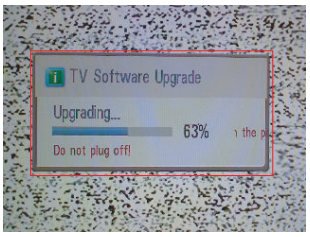
7. USB S/W download(option, Service only)

1) Put the USB Stick to the USB socket.
2) Automatically detecting update file in USB Stick.
- If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.

3) Show the message "Copying files from memory".



4) Updating is starting.



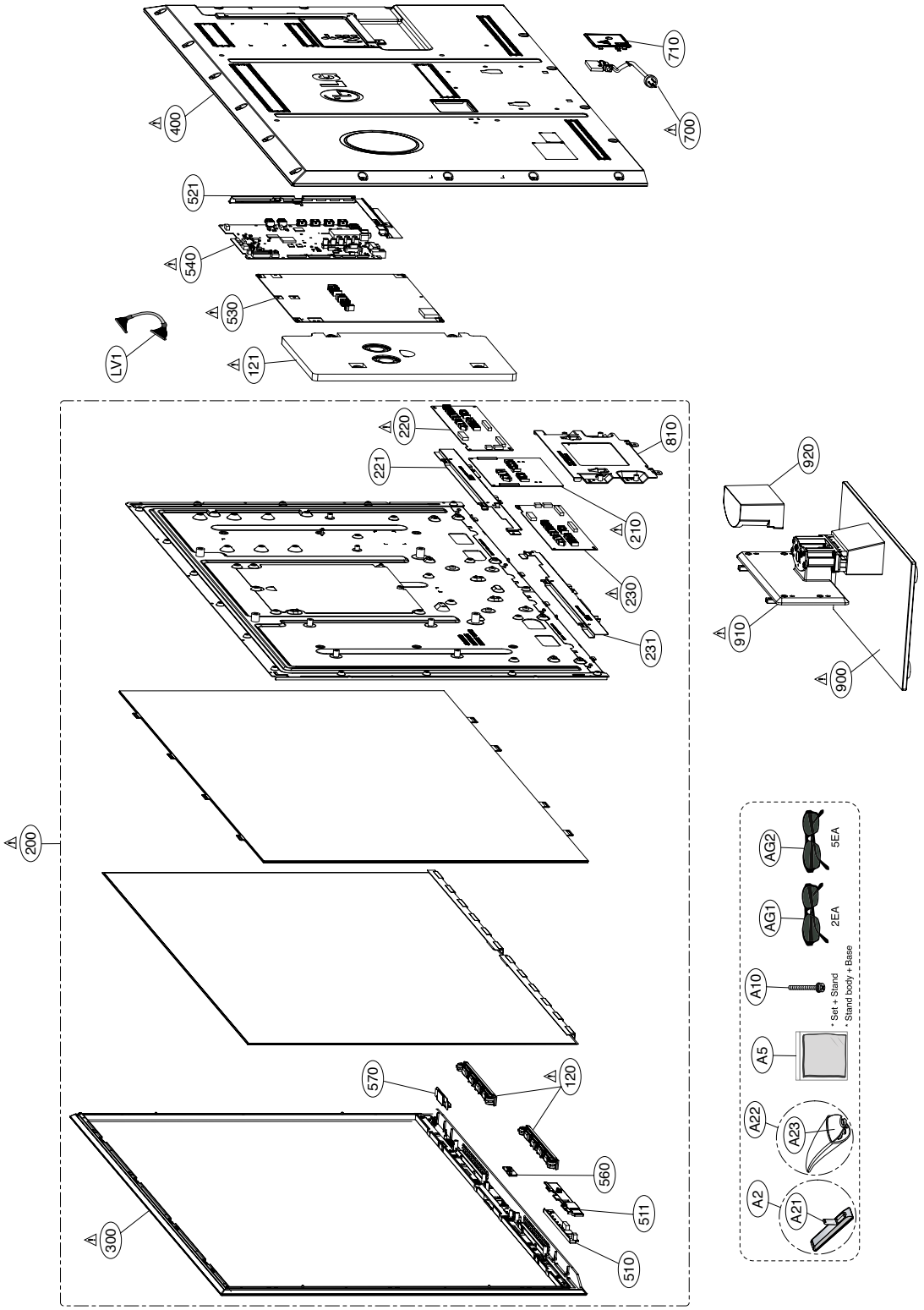
5) Updating Completed, The TV will restart automatically.
6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust TOOL OPTION again.
1) Push "IN-START" key in service remote control.
2) Select "Tool Option 1" and push "OK" key.
3) Punch in the number.(Each model has their number.)

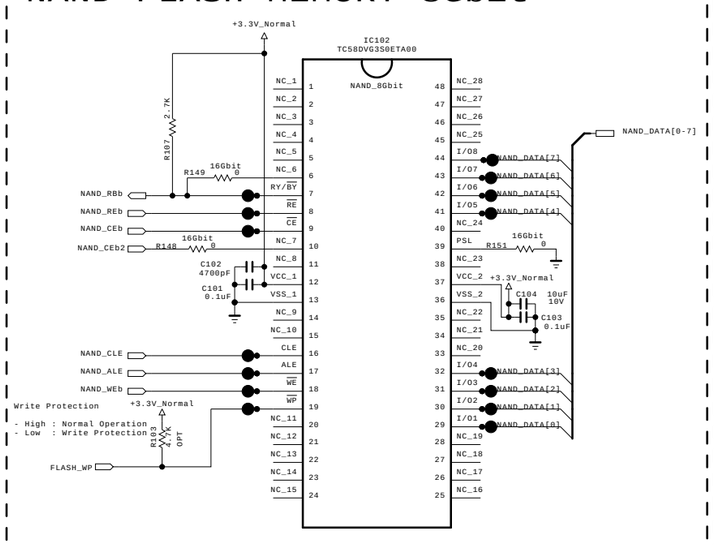
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

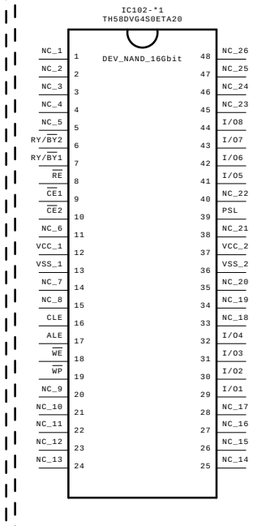
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.



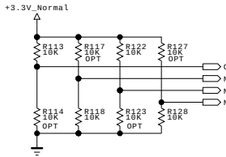
NAND FLASH MEMORY 8Gbit



16Gbit

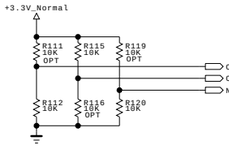


Boot ROM Device Select - (FA4,FAD7,FAD2,FAD1)



0000: ST Micro M25P or compatible Serial Flash
0010: 8-bit 512Mbit 512B page SLC NAND Flash devices
0100: 8-bit 128, 256Mbit 512B page SLC NAND Flash devices
0110: 8-bit 1Gbit 2KB page SLC NAND Flash devices
1000: 8-bit 2Gbit, 4Gbit, 8Gbit 2KB page SLC NAND Flash devices
1010: 8-bit 16Gbit, 32Gbit 4KB page SLC NAND Flash devices (O)
0001: 8-bit 8/16/32Gbit 2KB page MLC NAND Flash devices
0011: 8-bit 16/32Gbit 4KB page MLC NAND Flash devices
0101: 8-bit 32Gbit 8KB page MLC NAND Flash devices
0111: 3B dual IO Serial Flash
1001: 8B dual IO Serial Flash
1011: fast Serail Flash > 50Mhz
1100: OneNAND Flash (always 16-bit)
1110: Reserved
1101, 1111: Reserved

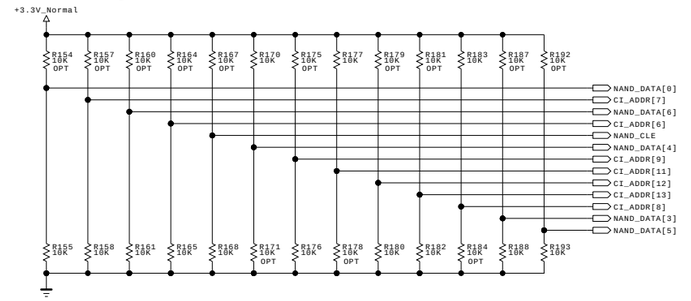
NAND ECC (FA3, FA2, FALE)



000 = ECC disabled
001 = ECC 1-bit repair
010 = ECC 4-bit BCH (O)
011 = ECC 8-bit BCH, 27 byte spare
100 = ECC 12-bit BCH, 27 byte spare
101 = ECC 8-bit BCH, 16 byte spare
110, 111 = Reserveddd

DUAL COMPONENT	
IC102	1ST : EAN61000101 2ND : T-TH58DVG4S0ETA20
IC102-*1	

Strap Setting



NAND_DATA[0]:
0: System is LITTLE endian (O)
1: System is BIG endian

CI_ADDR[7]:
0: Disable EDID automatic Downloading from Flash (O)
1: Enable EDID automatic Downloading from Flash

NAND_DATA[6] :
0: Disable OSC clock output on chip Pin (O)
1: Enable OSC clock output on chip pin.

CI_ADDR[6]:
0: Host MIPS run at 500 MHz (O)
1: Host MIPS run at 250 MHz

NAND_CLE:
0: Differential Oscillators TVM not bypassed (O)
1: Differential Oscillators TVM bypassed

NAND_DATA[4]:
0: 27MHz TVM Crystal Frequency
1: 54MHz TVM Crystal Frequency (O)

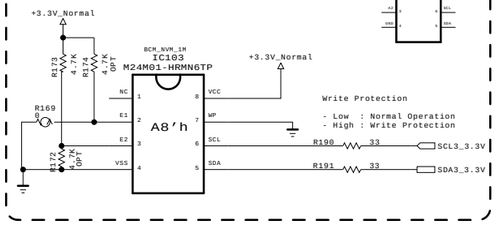
CI_ADDR[9],CI_ADDR[11],CI_ADDR[12],CI_ADDR[13]
TVM Crystal oscillator bias/gain control
0000: 210uA
0001: 390uA
0010: 570uA
0011: 730uA
0100: 890uA (O)
0111: 1290uA
1000: 1416uA
1111: 2196uA
0101, 0110, 1001, 1010, 1011, 1100, 1101, 1110: Reserved

CI_ADDR[8]:
0: RESETOUTb (in On/Off only) stay asserted until software releases them.
1: Fix amount of delay for de-assertion on RESETOUTb (in On/IOff only) at end of RESETb pulse (O)

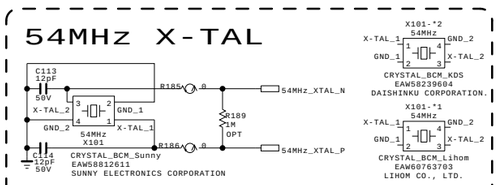
NAND_DATA[3]:
0: MIPS will boot from external flash (O)
1: MIPS will boot from ROM

NAND_DATA[5]:
0: FLASH MODE (O)
1: BSC_SLAVE(BBS) MODE

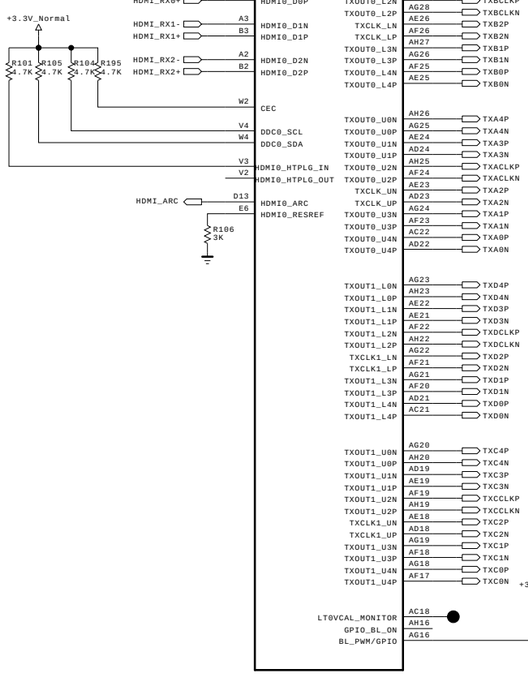
NVRAM

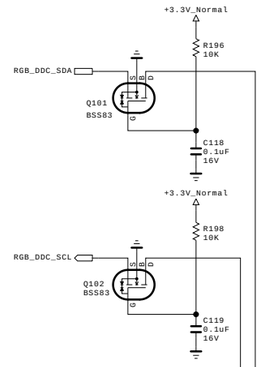


54MHz X-TAL

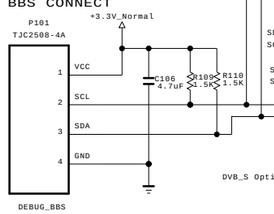


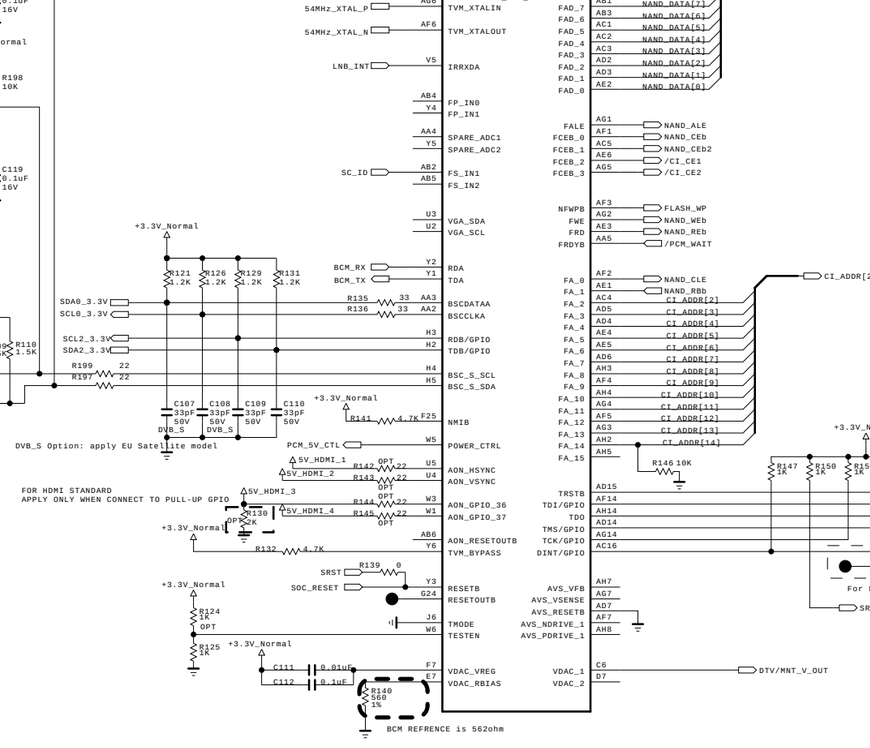
IC101 LGE35230(BCM35230KFSBG)





BBS CONNECT





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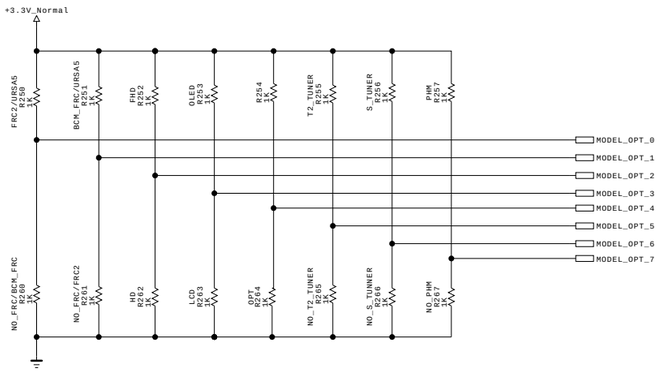
SECRET
LGElectronics

LG ELECTRONICS

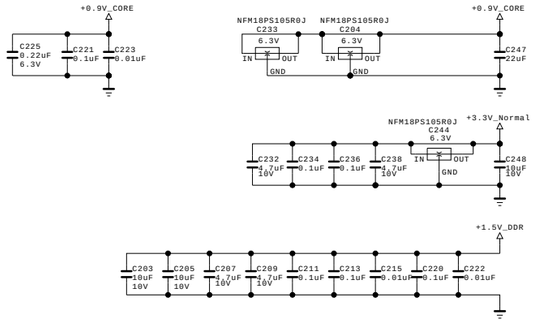
MODEL	BCM35230	DATE	2010.09.18
BLOCK	MAIN & NAND FLASH	SHEET	1

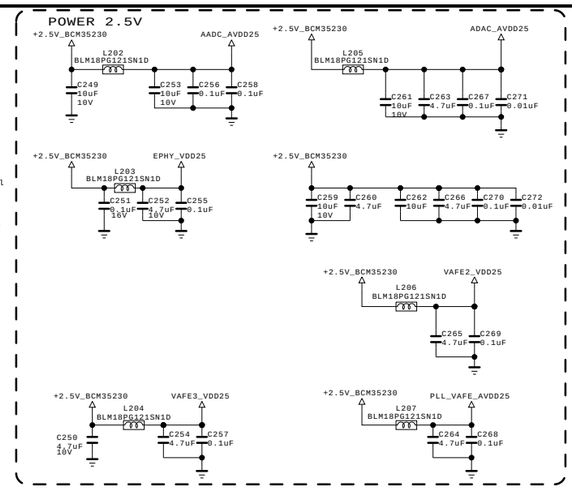


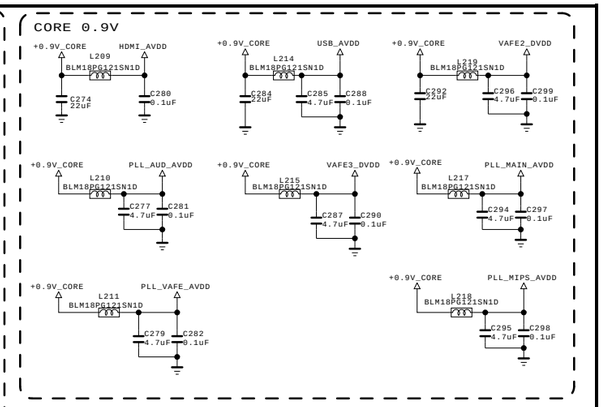
MODEL OPTION

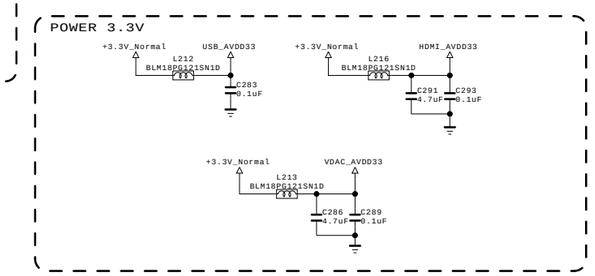
	NO_FRC	BCM internal FRC	LG FRC2	external URSA5
MODEL_OPT_0	0	0	1	1
MODEL_OPT_1	0	1	0	1

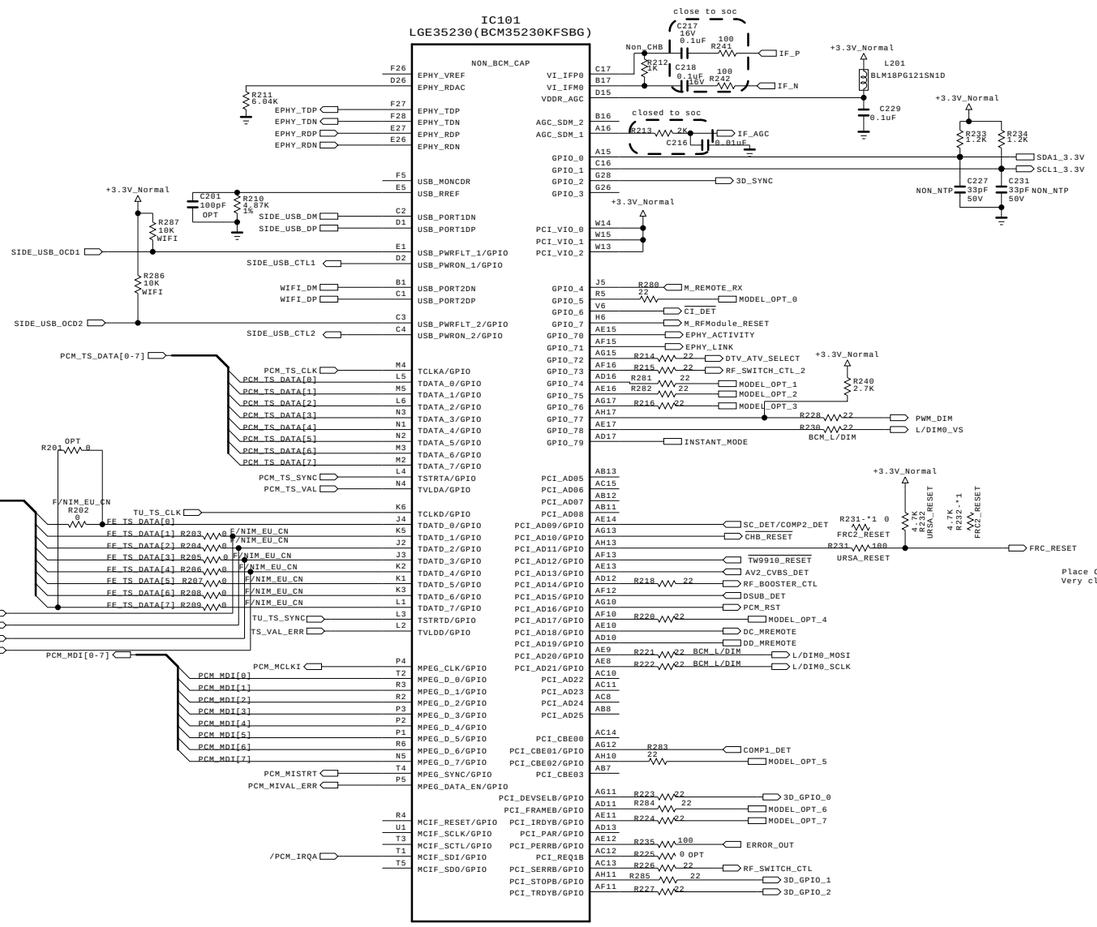
		HIGH	LOW
MODEL_OPT_2		FHD	HD
MODEL_OPT_3		OLED	LCD
MODEL_OPT_4	DDR speed	1333	1600
MODEL_OPT_5	T2 Tuner	Support	Not Support
MODEL_OPT_6	S Tuner	Support	Not Support
MODEL_OPT_7	PHM	Enable	Disable

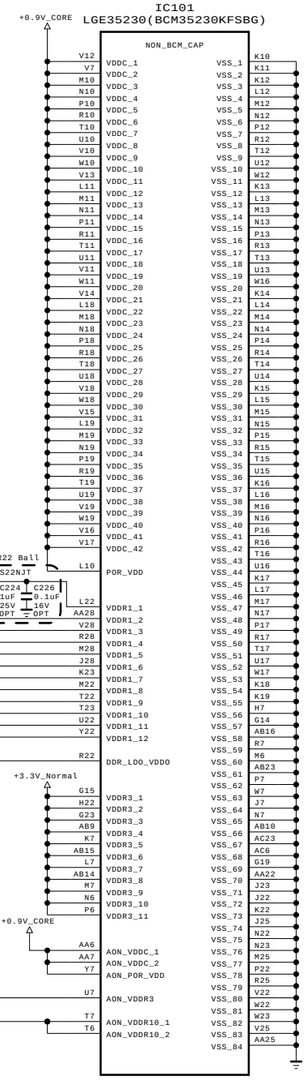


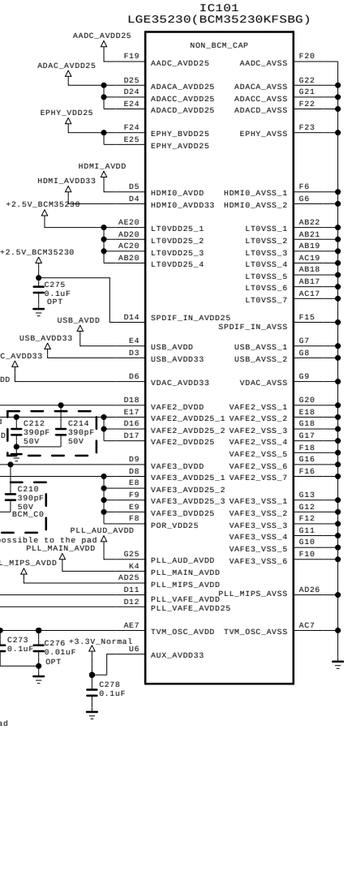












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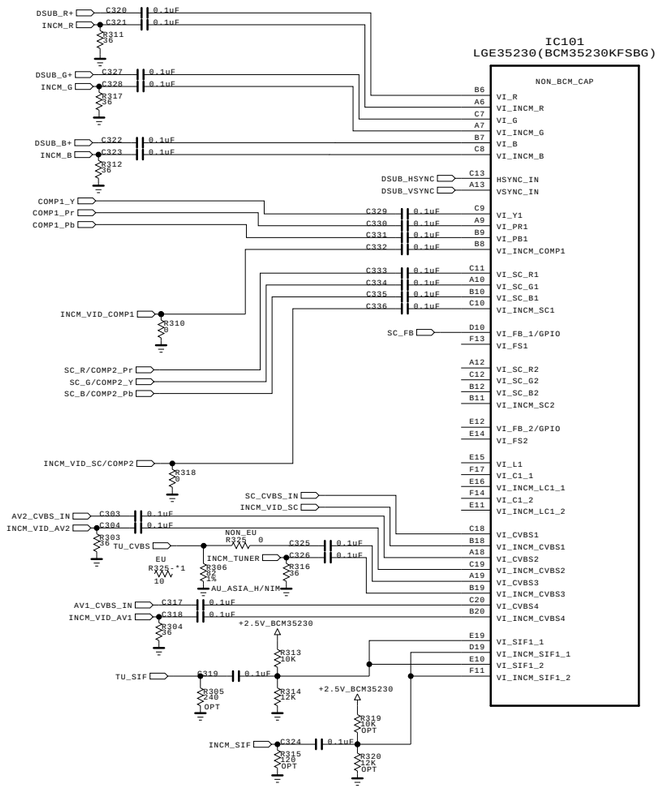
SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MAIN POWER	SHEET	2 / 50



VIDEO INCM

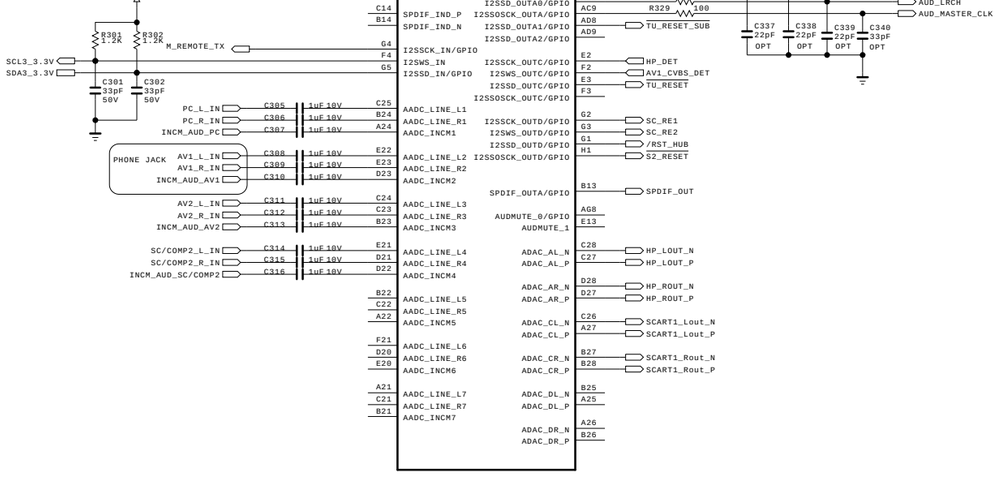
Near P801	Run Along DSUB_R Trace	INCM_R
Near P801	Run Along DSUB_G Trace	INCM_G
Near P801	Run Along DSUB_B Trace	INCM_B
Near JK1101	Run Along COMP_Y_IN,COMP_Pr_IN,COMP_Pb_IN Trace	INCM_VID_COMP1
Near JK1104	Run Along AV2_CVBS Trace	INCM_VID_AV2
Near TU2101/2 TU2201/2/3	Run Along TUNER_CVBS_IF_P Trace	INCM_TUNER
Near JK1102	Run Along AV1_CVBS Trace	INCM_VID_AV1
Near JK1103 JK2501	Run Along COMP_Y_IN,COMP_Pr_IN,COMP_Pb_IN/SC R,G,B Trace	INCM_VID_SC/COMP2

BCM35230_with_CAP_220pF

IC101-*1
LGE35230

BCM_CAP

VI_R
VI_INCM_R
VI_G
VI_INCM_G
VI_B
VI_INCM_B
HSYNC_IN
VSYNC_IN
VI_Y1
VI_PR1
VI_PB1
VI_INCM_COMP1
VI_SC_R1
VI_SC_G1
VI_SC_B1
VI_INCM_SC1
VI_FB_1/GPIO
VI_FS1
VI_SC_R2
VI_SC_G2
VI_SC_B2
VI_INCM_SC2
VI_FB_2/GPIO
VI_FS2
VI_L1
VI_C1_1
VI_INCM_LC1_1
VI_C1_2
VI_INCM_LC1_2
VI_CVBS1
VI_INCM_CVBS1
VI_CVBS2
VI_INCM_CVBS2
VI_CVBS3
VI_INCM_CVBS3
VI_CVBS4
VI_INCM_CVBS4
VI_SIF1_1
VI_INCM_SIF1_1
VI_SIF1_2
VI_INCM_SIF1_2



AUDIO INCM

Near JK1102	R321 0	Route Between AV1_L_IN & AV1_R_IN Trace	INCM_AUD_AV1
Near JK1103 JK2501	R322 0	Route Between SC/COMP2_L_IN & SC/COMP2_R_IN Trace	INCM_AUD_SC/COMP2
Near JK1104	R323 0	Route Between AV2_L_IN & AV2_R_IN Trace	INCM_AUD_AV2
Near JK801	R324 0	Route Between PC_L_IN & PC_R_IN Trace	INCM_AUD_PC
Near TU2101/2 TU2201/2/3		Route Along With TUNER_SIF_IF_N	INCM_SIF

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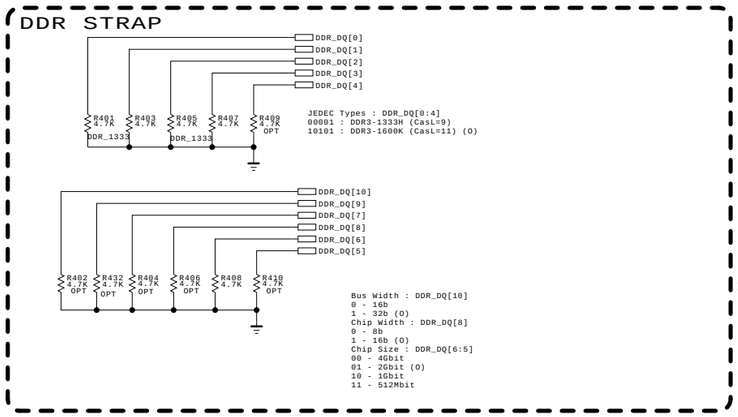
SECRET
LGElectronics

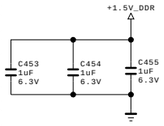
LG ELECTRONICS

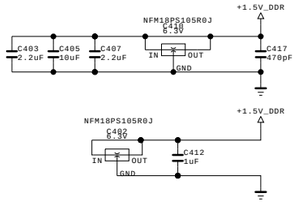
MODEL	BCM35230	DATE	
BLOCK	MAIN AUDIO/VIDEO	SHEET	3 / 50

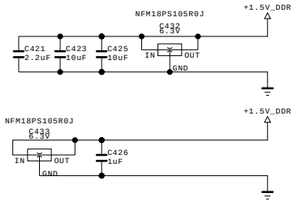
DUAL COMPONENT	
IC401,IC402	1ST : EAN61667501, 2ND : EAN61570701
IC401-*1 IC402-*1	1ST : T-K4B2G1646B_HCK0, 2ND : T-H5TQ2G63BFR-PBC

DDR STRAP

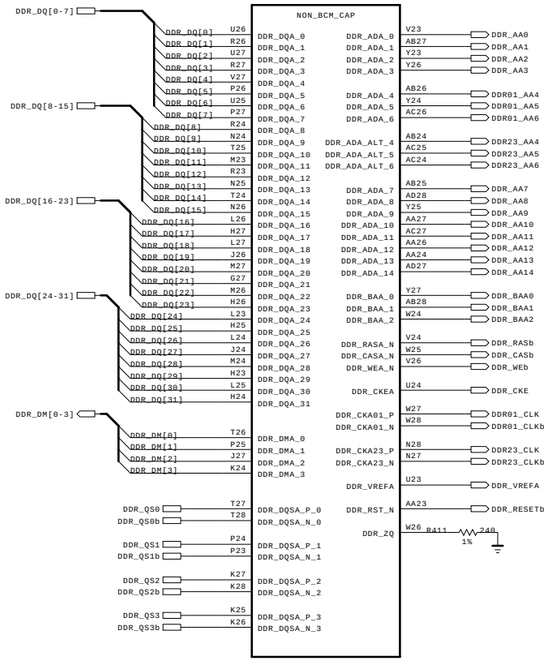




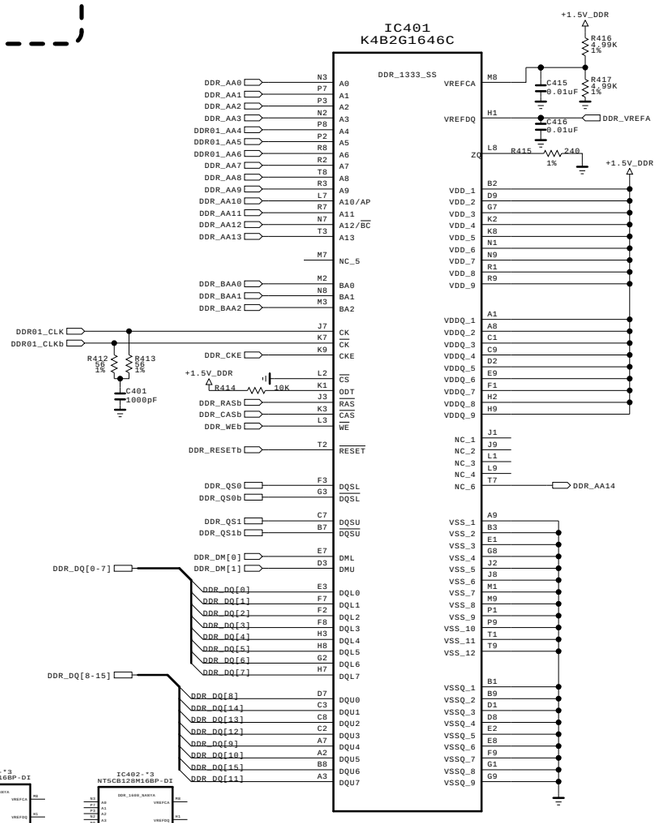




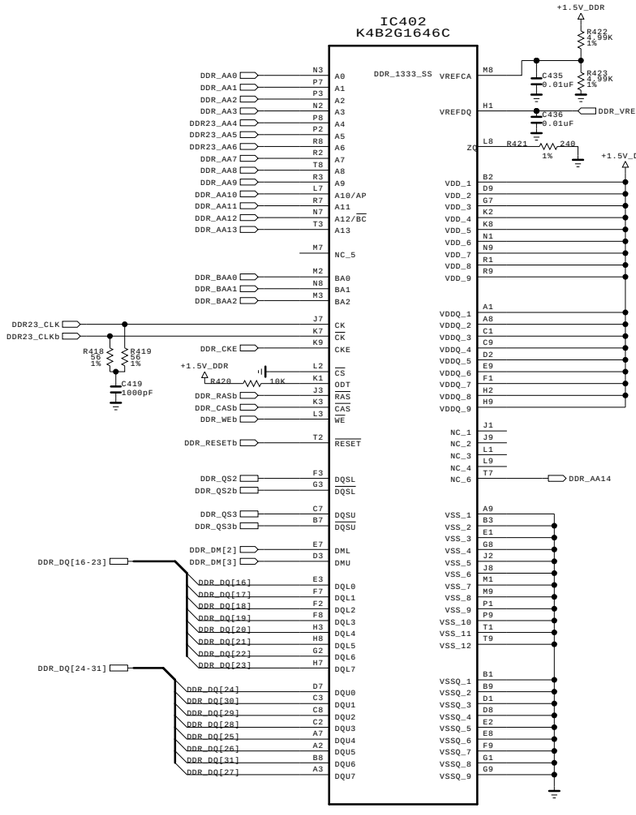
IC101
LGE35230(BCM35230KFSBG)

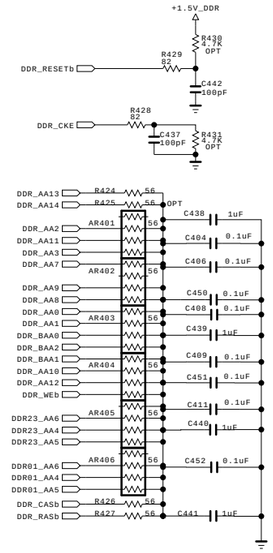


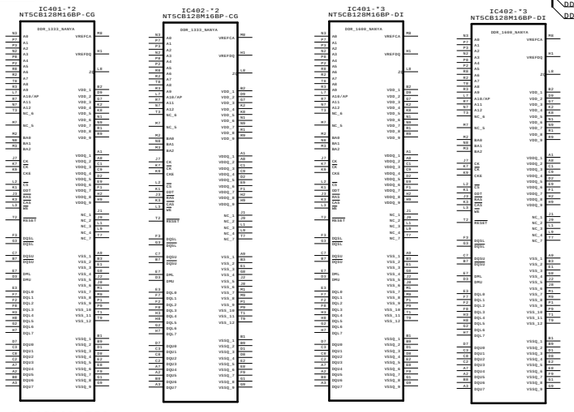
IC401
K4B2G1646C

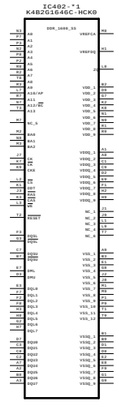


IC402
K4B2G1646C









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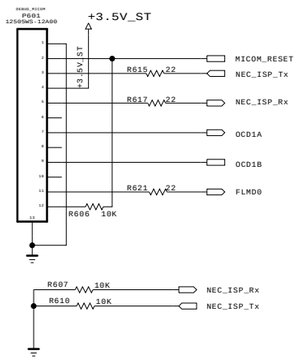
SECRET
LGElectronics

LG ELECTRONICS

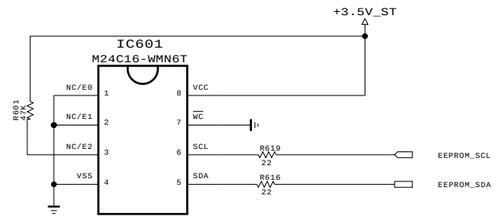
MODEL	BCM35230	DATE	
BLOCK	MAIN DDR	SHEET	4 / 50

NEC MICOM

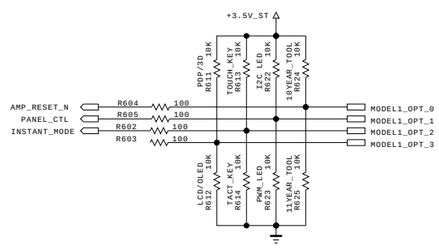
For Debug



EEPROM for Micom



MICOM MODEL OPTION

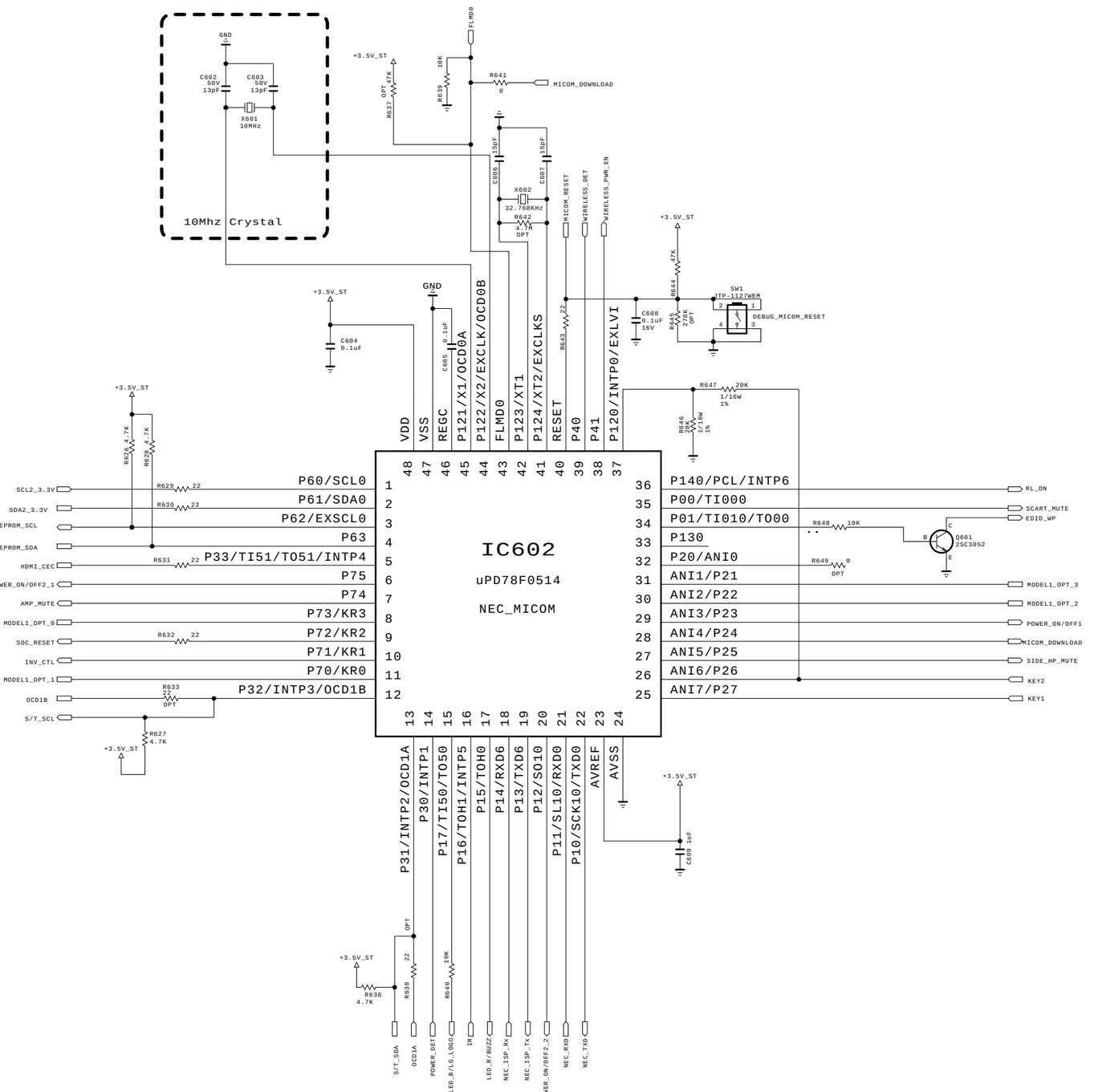


MODEL OPTION

PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	8	10YEAR_TOOL (10 SENSOR)	11YEAR_TOOL (11 SENSOR)
MODEL_OPT_1	11	I2C_LED	PWM_LED
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY
MODEL_OPT_3	31	PDP/3D	LCD/OLED

	LCD	PDP	OLED	3D
MODEL_OPT_3	0	1	0	1

	LOW	LOW_SMALL	TBD	HIGH
MODEL_OPT_1	0	0	1	1
MODEL_OPT_2	0	1	0	1



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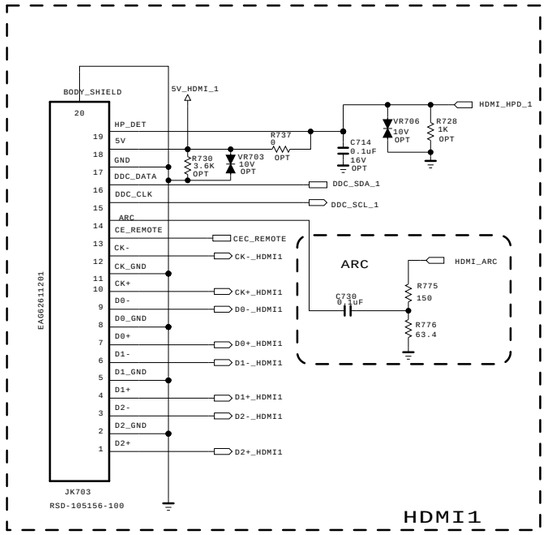
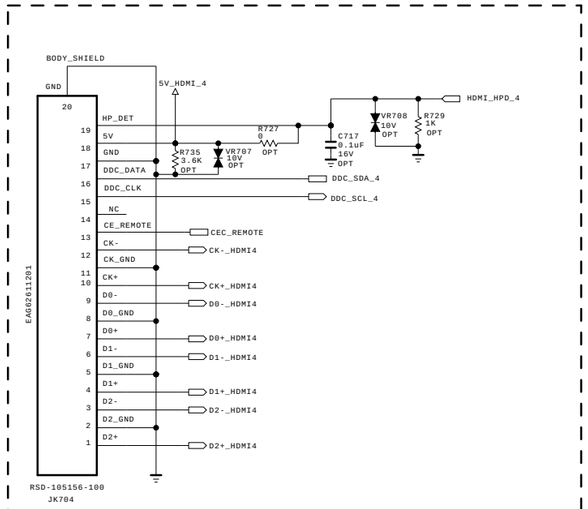
SECRET
LGElectronics

LG ELECTRONICS

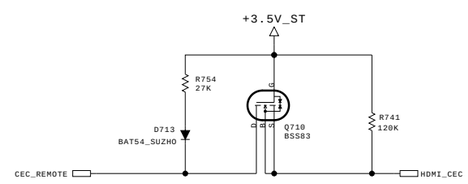
MODEL	BCM35230	DATE	
BLOCK	MICOM	SHEET	6 / 50

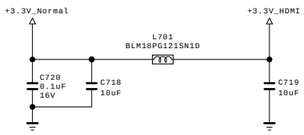
DUAL COMPONENT	
D707,D708 D710,D711	1ST : 0DD184009AA 2ND : 0DSIH00028A
D713	1ST : T-BAT54_SUZHO, 2ND : 0DSON00138A

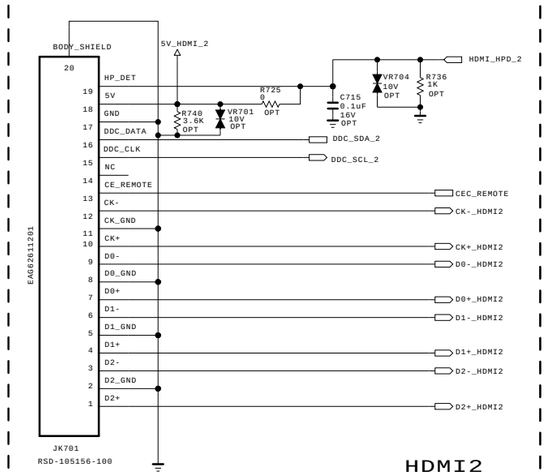


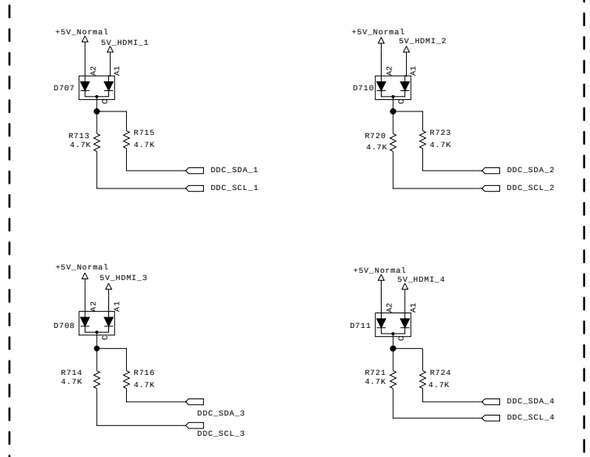


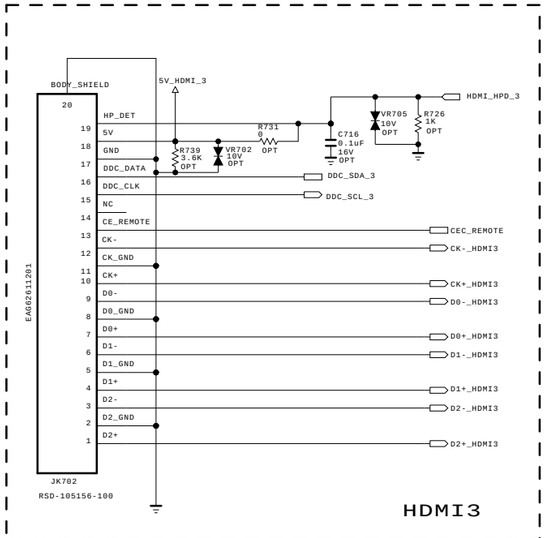
* HDMI CEC

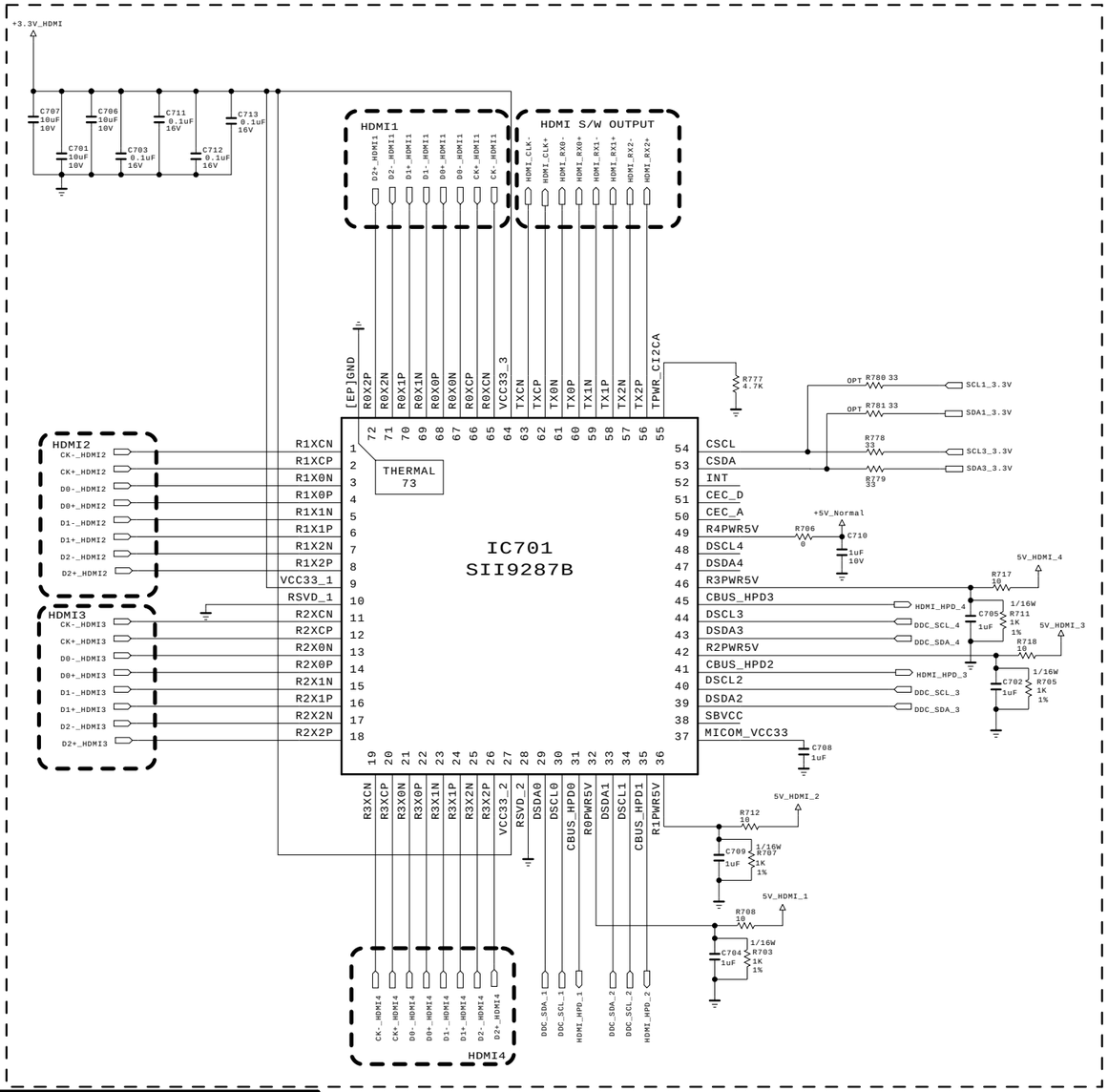












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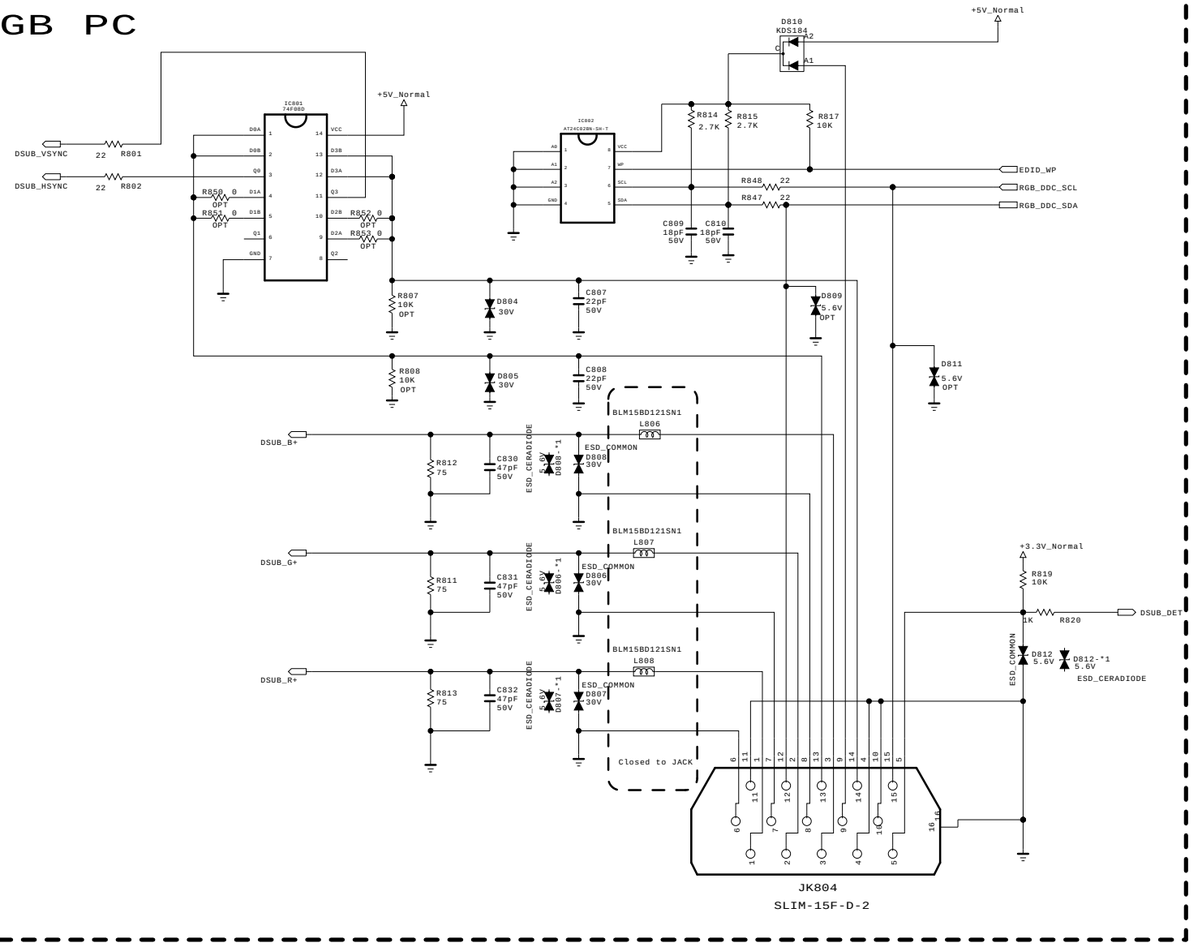
SECRET
LGElectronics

LG ELECTRONICS

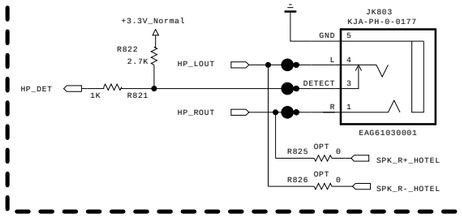
MODEL	BCM35230	DATE	
BLOCK	HDMI	SHEET	7 / 31

RGB/ PC AUDIO/ SPDIF/ EARPHONE/ RS232C

RGB PC

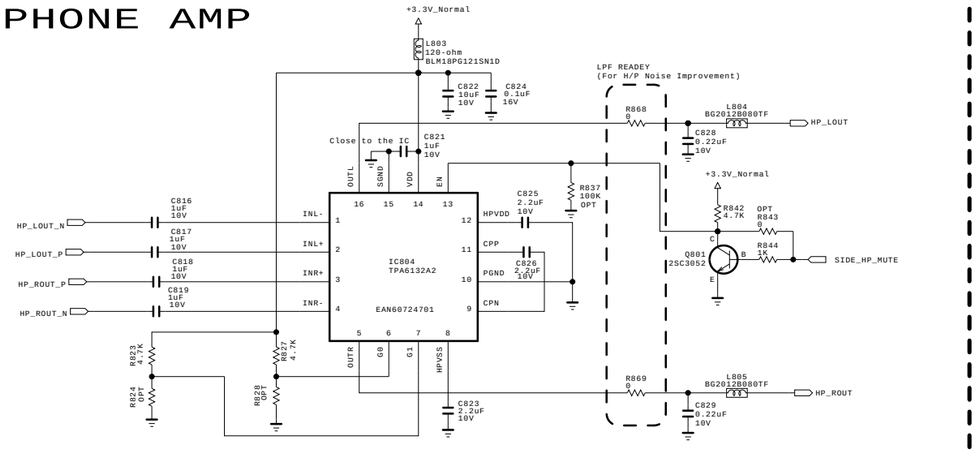


EARPHON JACK

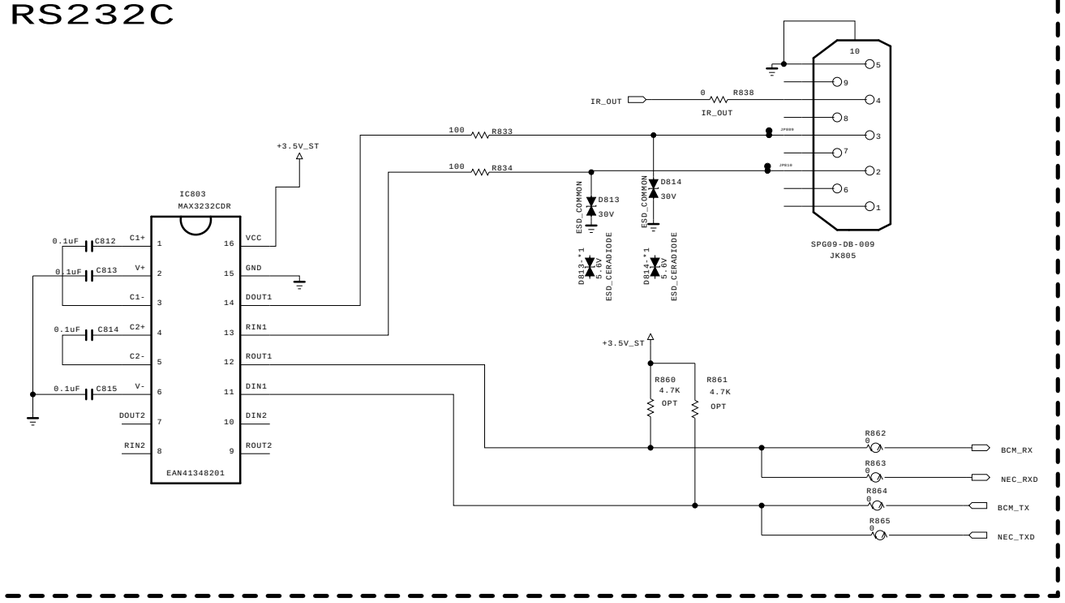


DUAL COMPONENT	
D804,D805,D806 D807,D808,D813 D814	1ST : EAH39491601, 2ND : EAH33945901
D810	1ST : 0DD184009AA, 2ND : 0DSIH00028A
Q801	1ST : 0TRIY80001A, 2ND : 0TR387500AA
IC805	1ST : EAN61151201, 2ND : EAN61130001

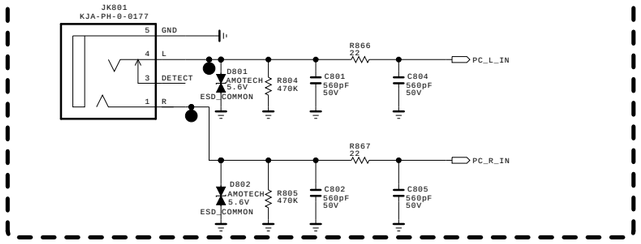
EARPHONE AMP



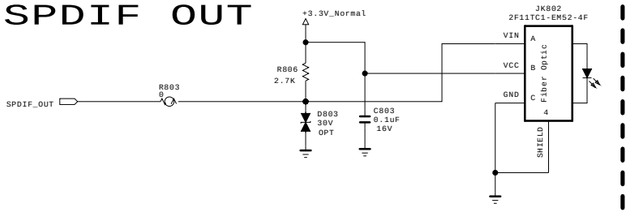
RS232C



PC AUDIO



SPDIF OUT



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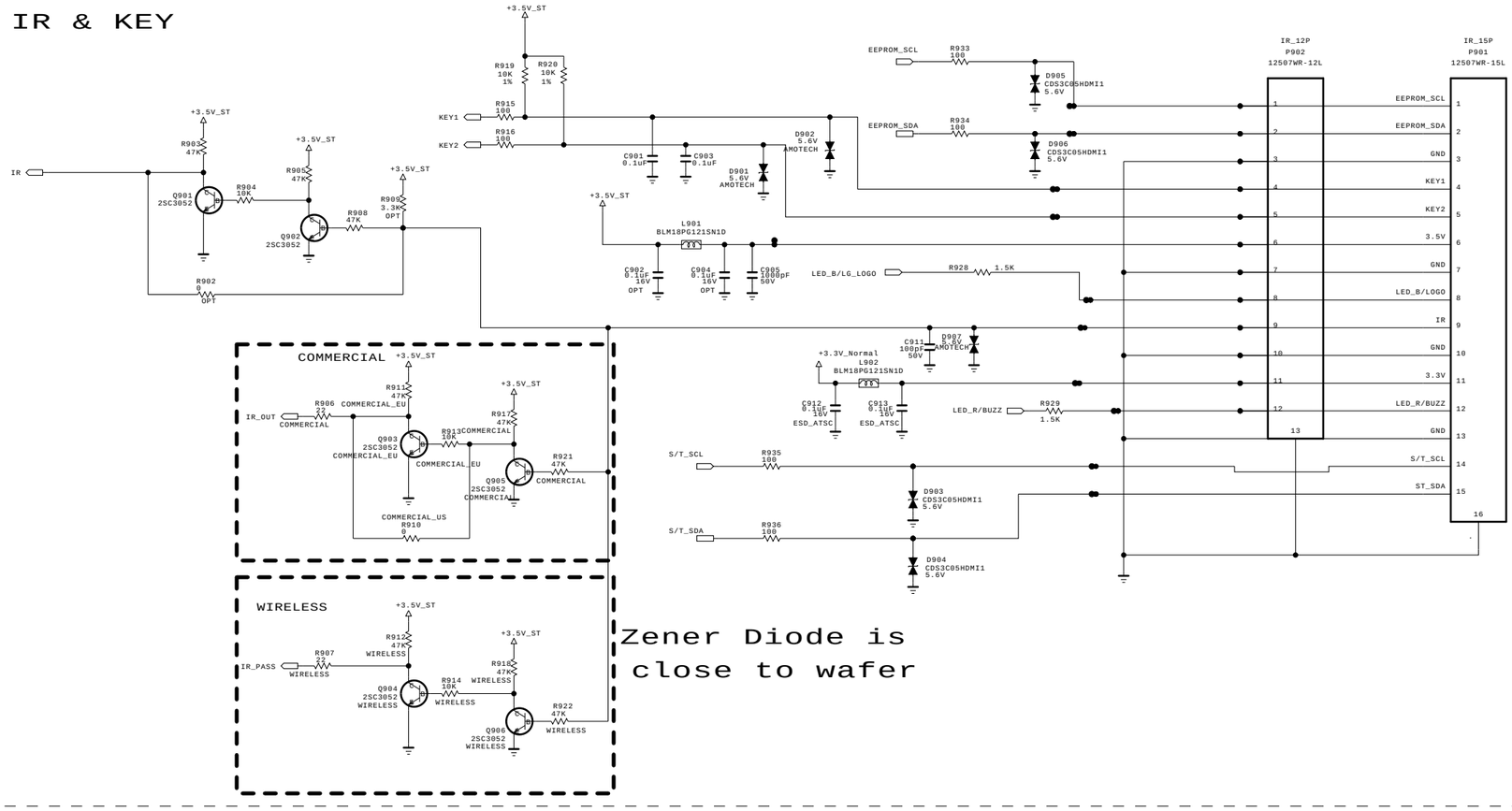
SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.10.21
BLOCK	COMMON JACK	SHEET	8 / 58

DUAL COMPONENT	
Q901,Q902,Q903 Q904,Q905,Q906	1ST : 0TRIY80001A 2ND : 0TR387500AA
D903,D904 D905,D906	1ST : EAH42720601, 2ND : EAH60994401

IR & KEY



THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

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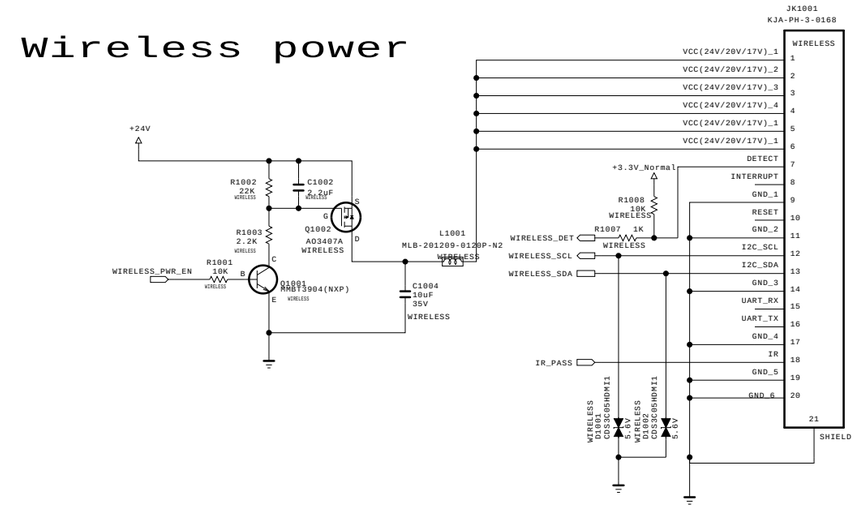
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	IR/KEY	SHEET	9 / 50

WIRELESS READY MODEL

DUAL COMPONENT	
D1001,D1002	1ST : EAH42720601 2ND : EAH60994401
Q1001	1ST : EBK61012601, 2ND : 0TRDI80002A
Q1002	1ST : EBK60752501, 2ND : EBK61011501

Wireless power



Wireless I2C connection with I2C_1
Address : 0X20

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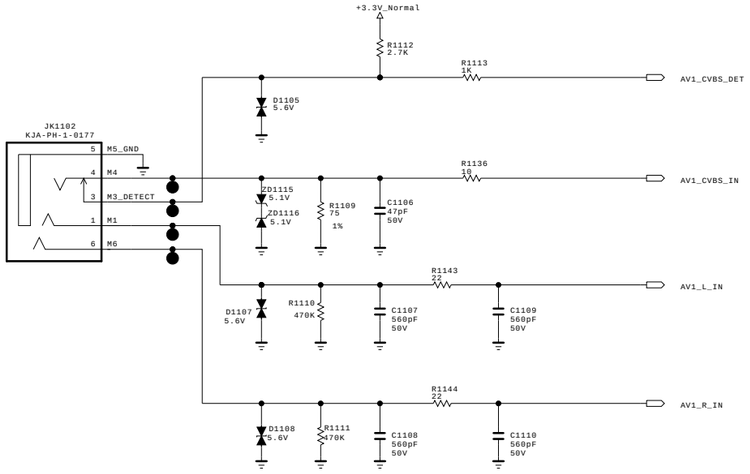
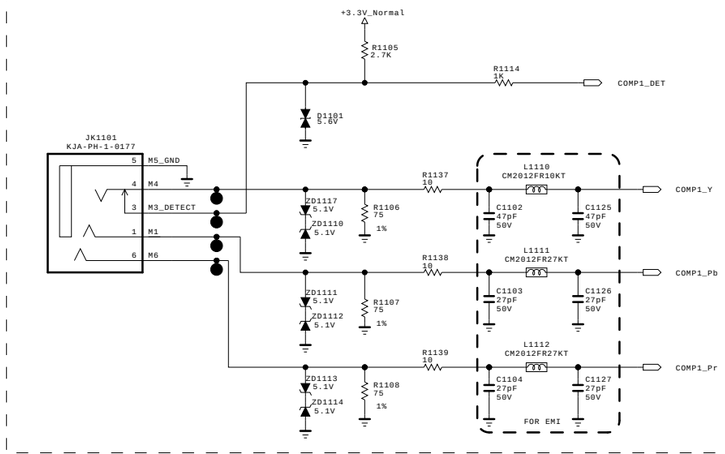
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	WIRELESS	SHEET	10 / 50

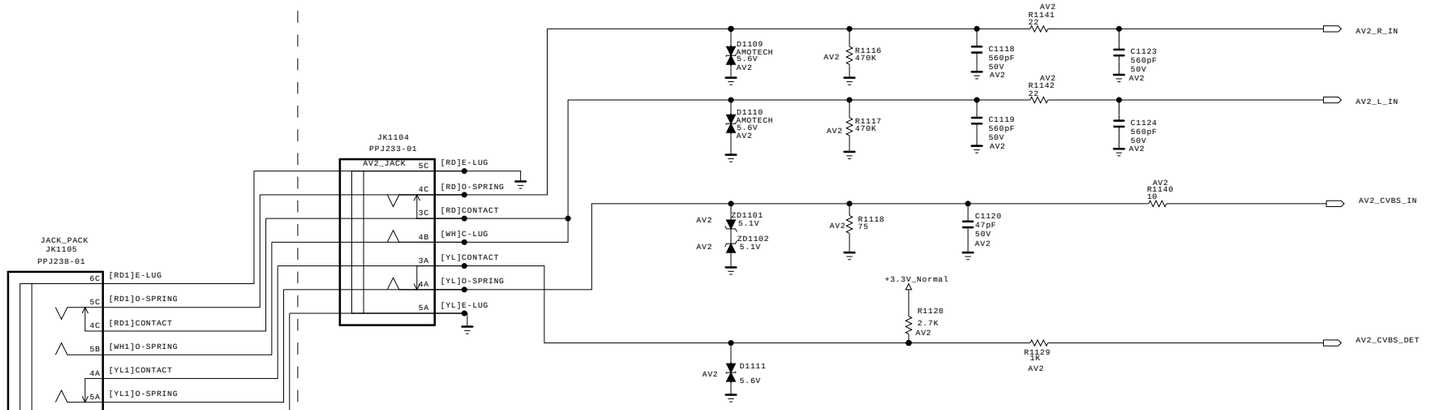
CVBS 1 PHONE JACK



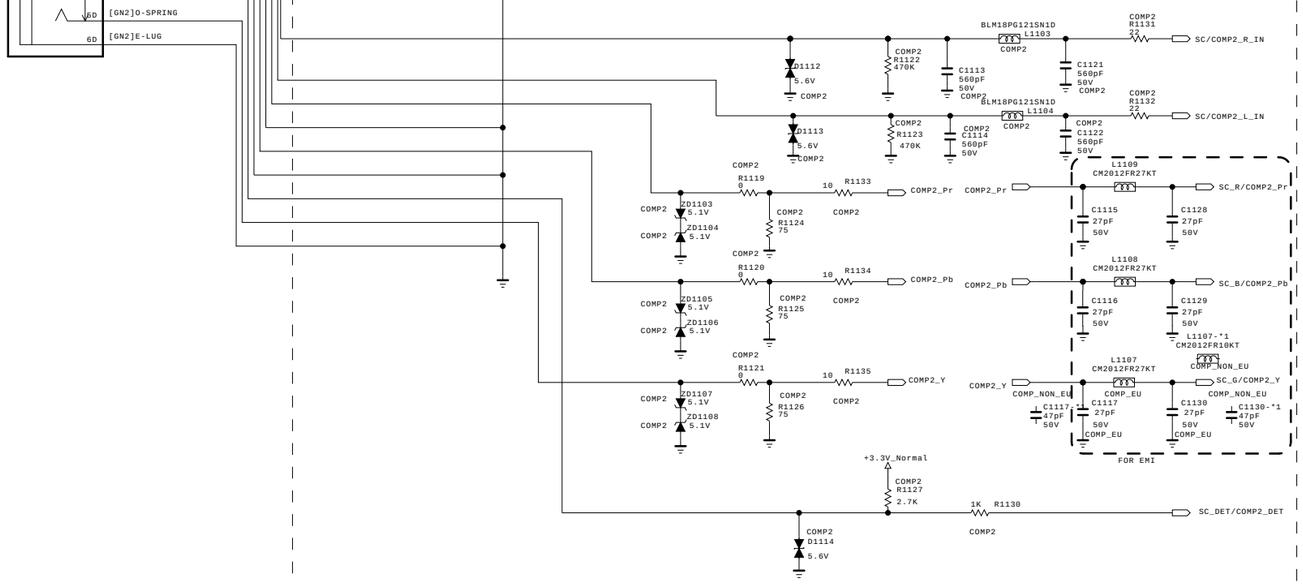
COMPONENT 1 PHONE JACK



CVBS2 REAR JACK



COMP2 REAR JACK



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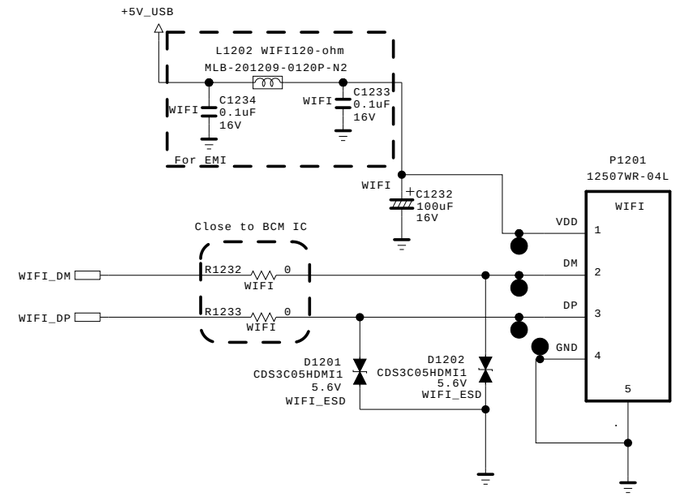
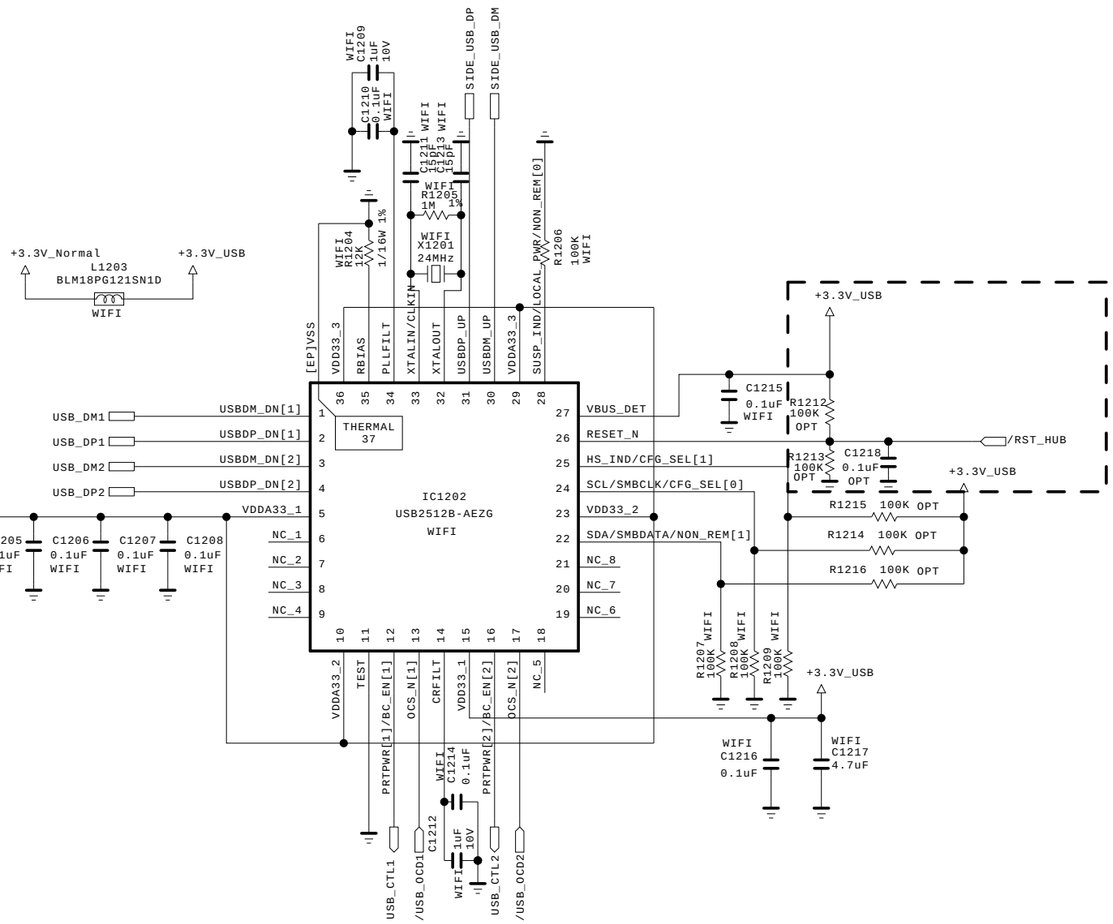
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	COMP/AV	SHEET	11 / 50

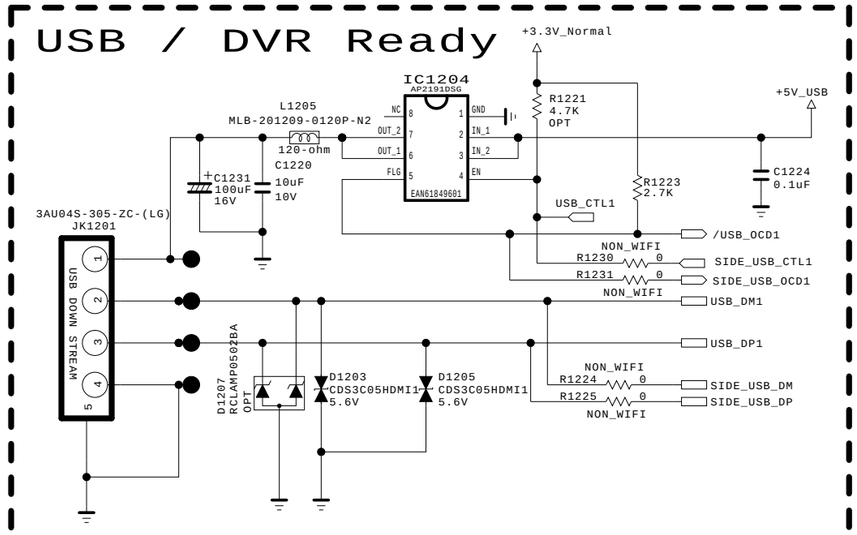
USB_WIFI



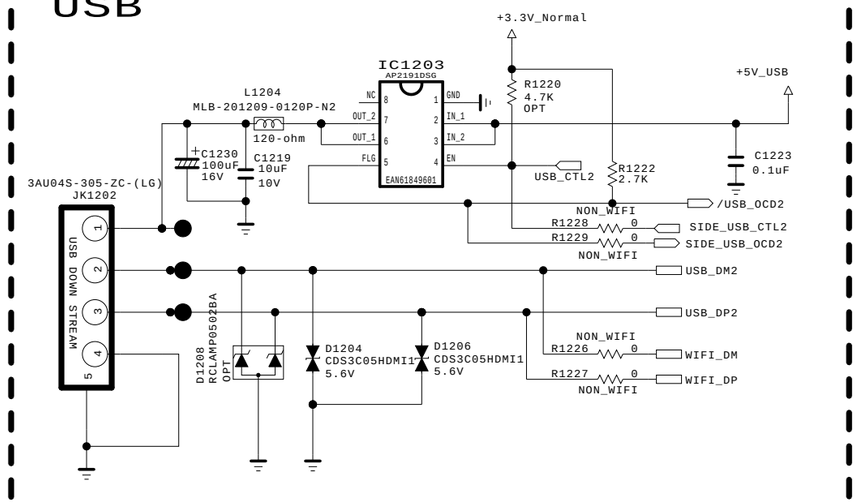


DUAL COMPONENT	
D1201,D1202 D1203,D1204 D1205,D1206	1ST : EAH42720601 2ND : EAH60994401

USB / DVR Ready



USB



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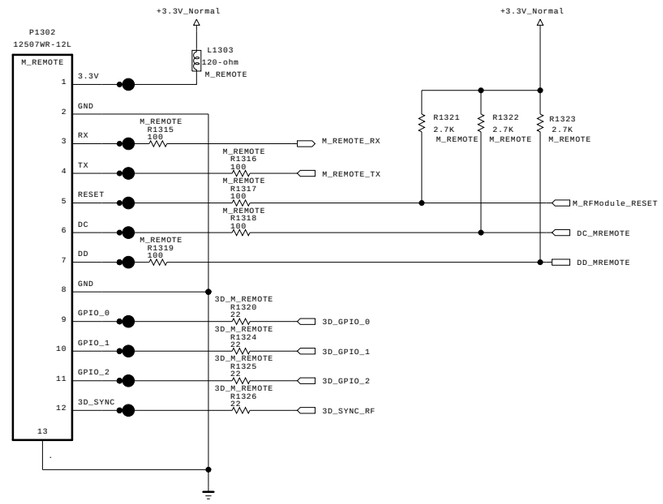
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	USB + WIFI	SHEET	12

TI solution M_REMOTE OPTION



ALL M_REMOTE OPTION

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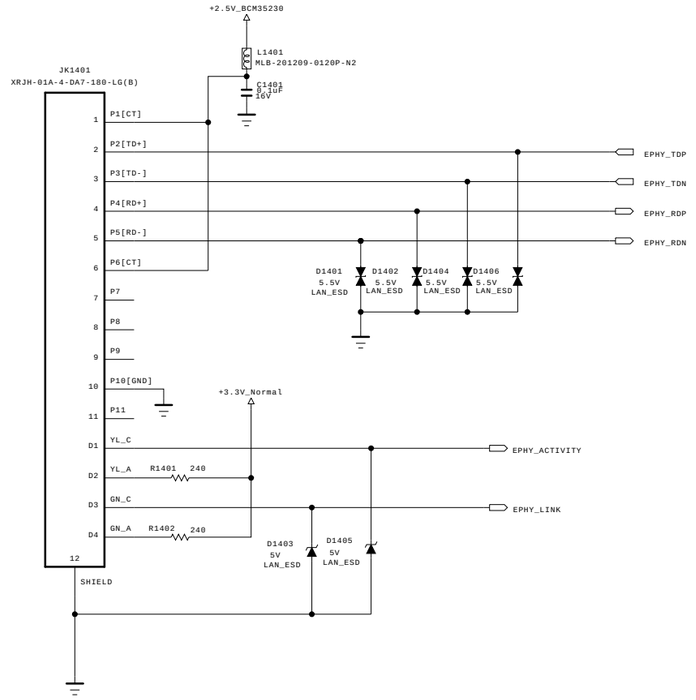
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	M_REMOCON	SHEET	13 / 50

Ethernet Block

DUAL COMPONENT	
D1401,D1402 D1403,D1404 D1405,D1406	1ST : EAH42720601 2ND : EAH60994401



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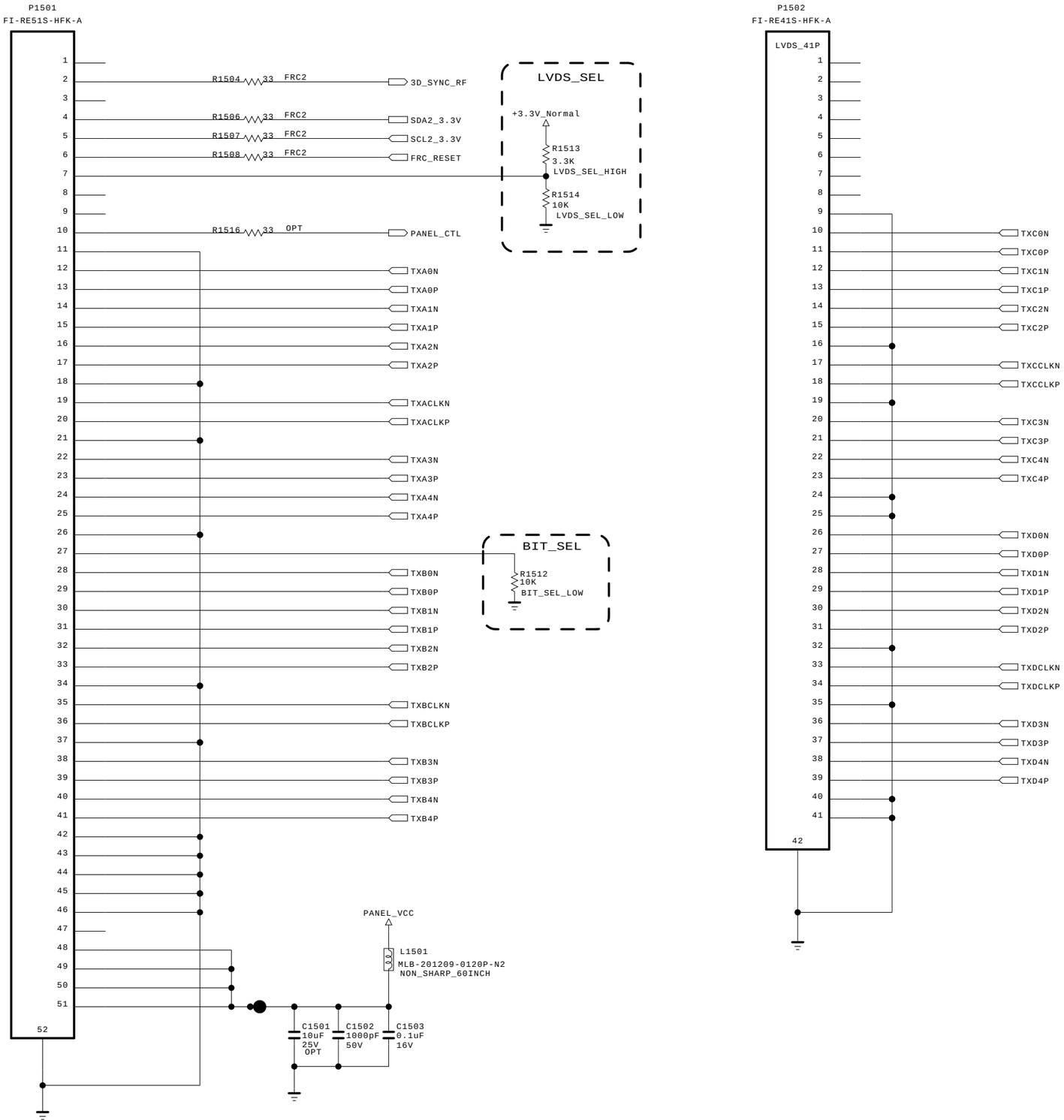
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	ETHERNET	SHEET	14 / 50

FHD120Hz LVDS output(51pin+41Pin)



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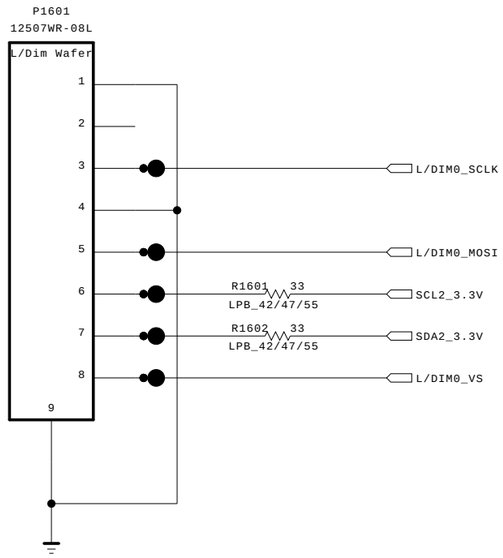
LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.03
BLOCK	LVDS	SHEET	15 / 50

[Local Dimming Block]



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SECRET

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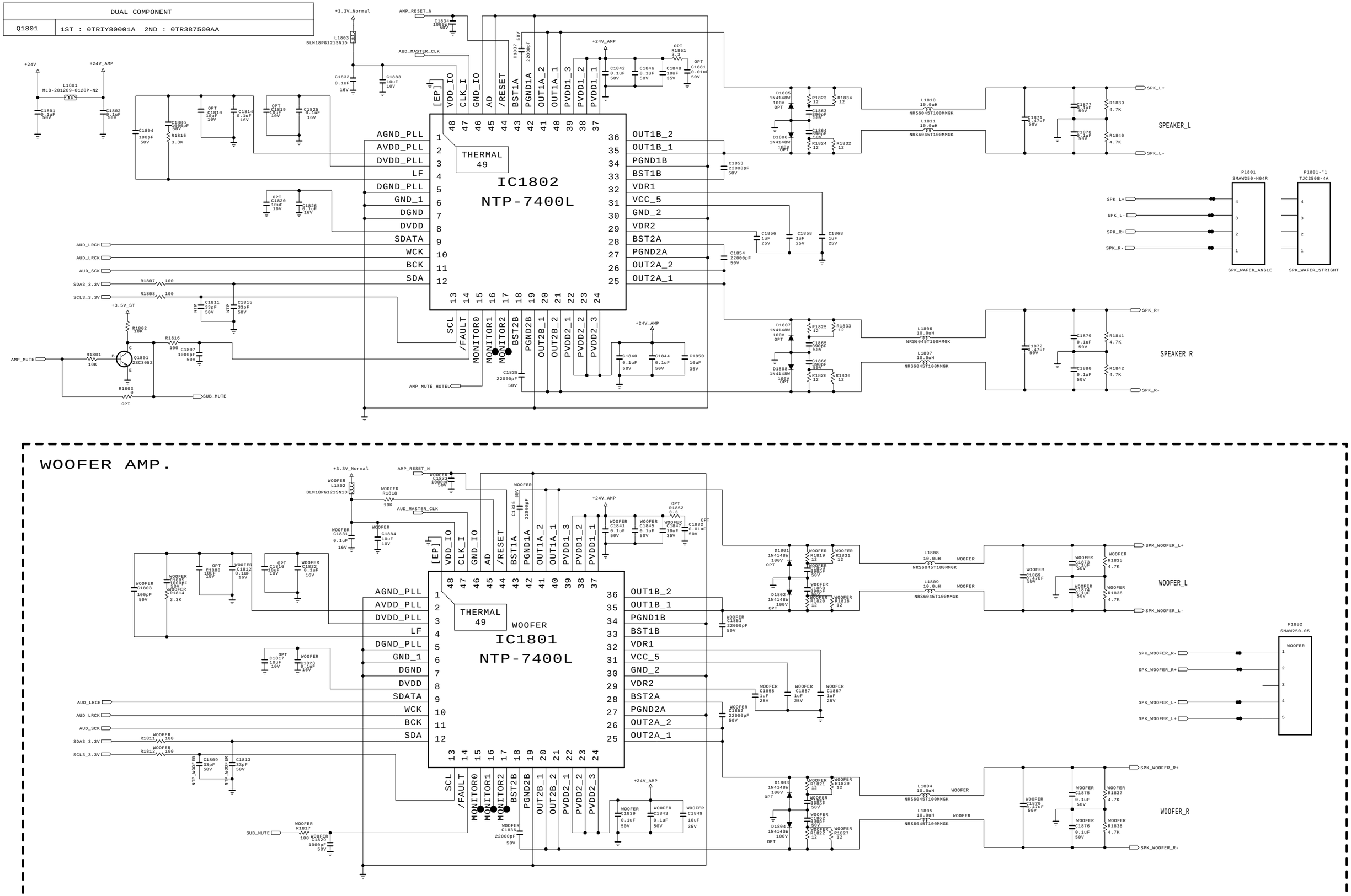
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	L_DIMMING	SHEET	16 / 50

DUAL COMPONENT	
Q1801	1ST : 0TRIY80001A 2ND : 0TR387500AA

WOOFER AMP.



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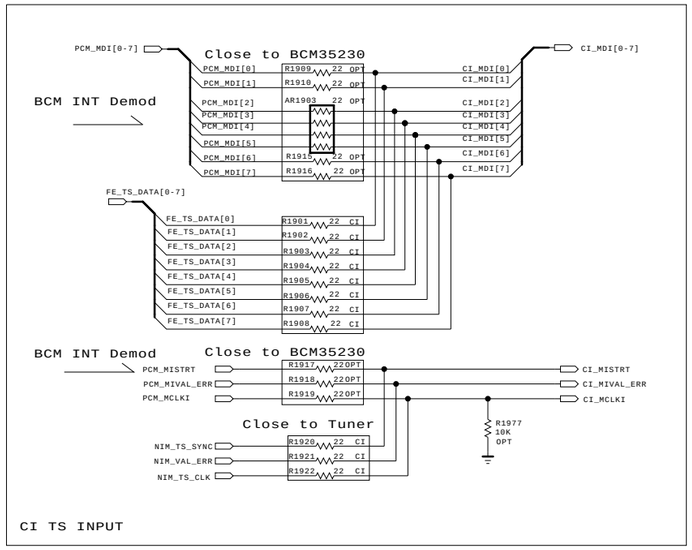
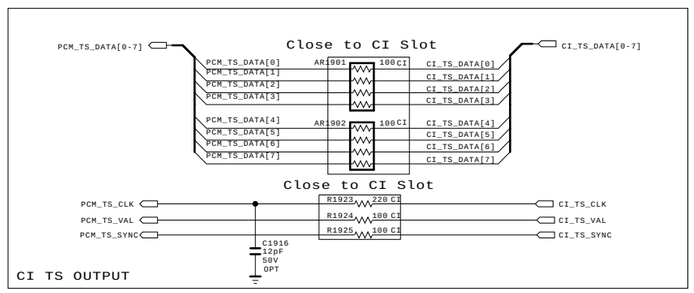
LG ELECTRONICS

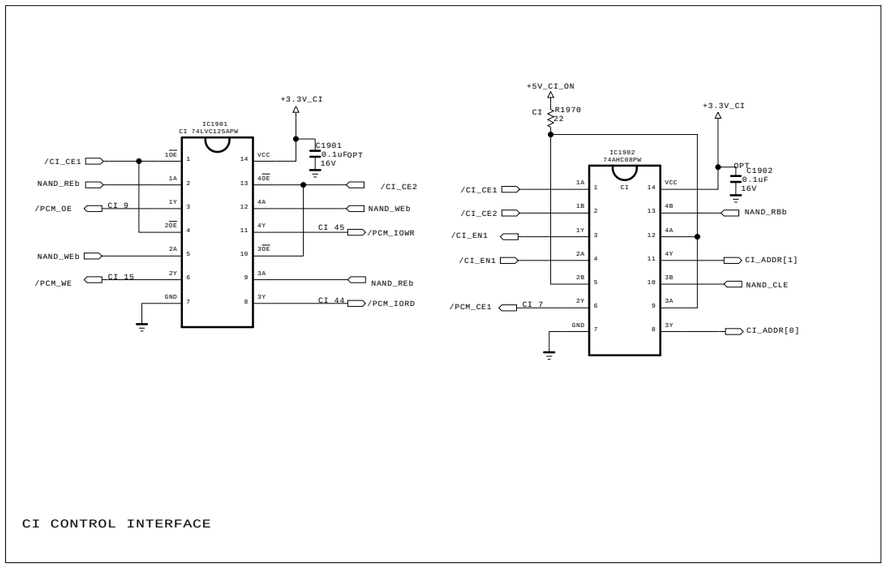
MODEL	BCM35230	DATE	
BLOCK	AUDIO[NEO]	SHEET	18 / 50

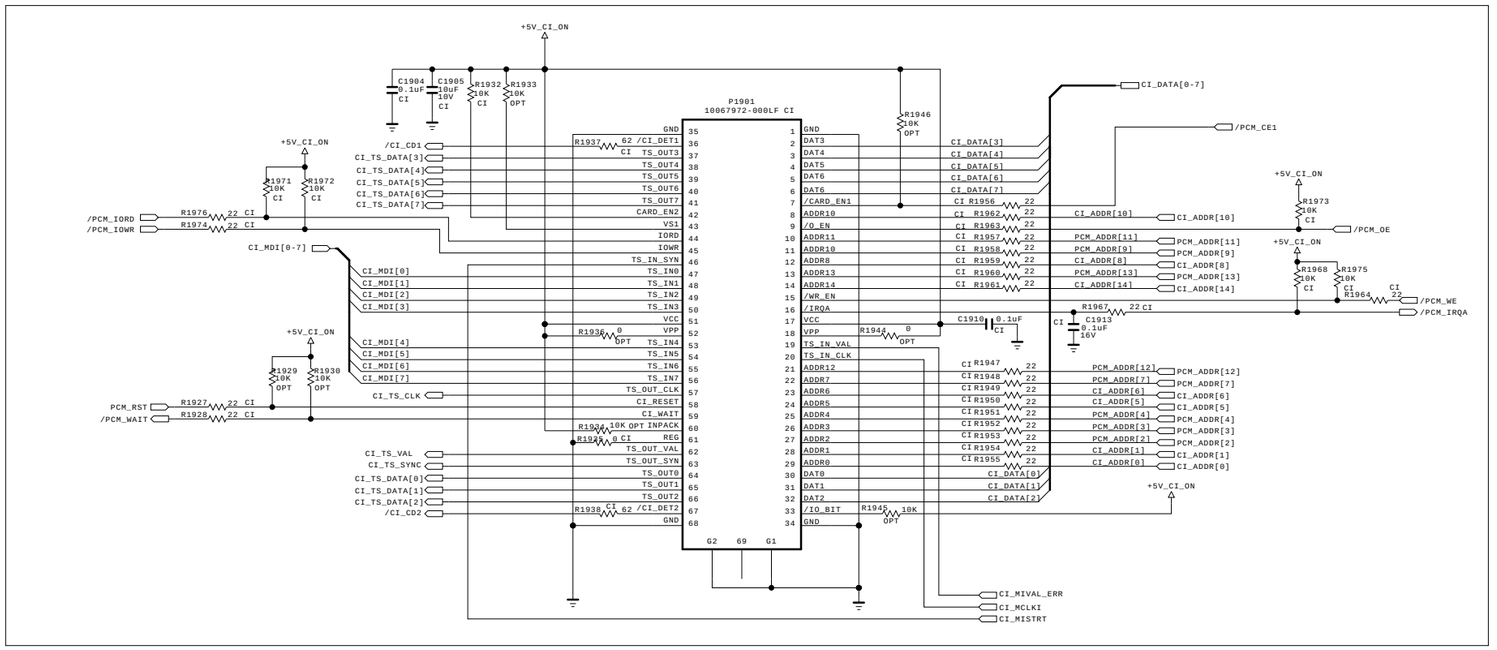
LGE Internal Use Only

DUAL COMPONENT	
Q1901	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q1902	1ST : EBK60752501, 2ND : EBK61011501
IC1904	1ST : 0ISTLPH062A, 2ND : EAN40055001

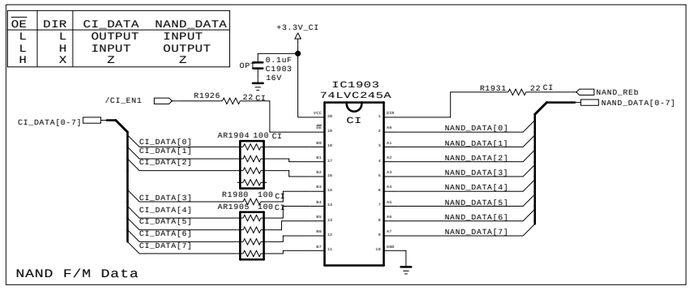


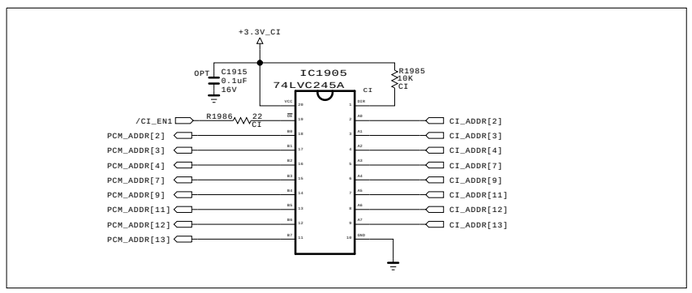


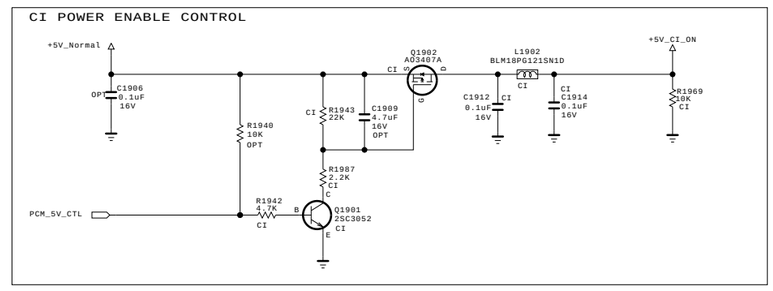


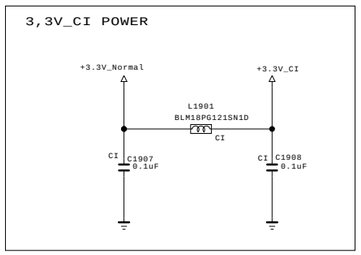


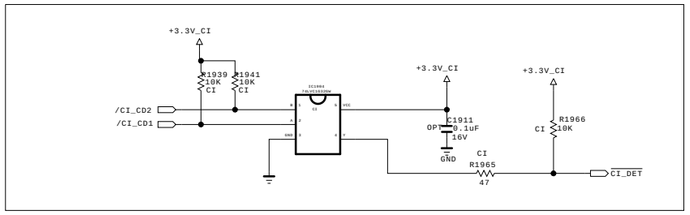
OE	DIR	CI_DATA	NAND_DATA
L	L	OUTPUT	INPUT
L	H	INPUT	OUTPUT
H	X	Z	Z











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SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.11
BLOCK	CI	SHEET	19 / 58

H/NIM & F/NIM & T/C/S2 Combo Tuner

DUAL COMPONENT	
IC2204	1ST:T-AP2114H(EAN61573601) / 2ND:T-TJ3940S (EAN61573501)

OPTION TABLE

H/NIM (EU)	H/NIM (AU,Latin)	H/NIM (Brazil,Taiwan)	F/NIM_T/C	F/NIM_T2	F/NIM_CN (China)	F/NIM_Brazil (Brazil)	DVB-T/C/S2 (Eu,Aisa)
Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	DVB_S
H/NIM	H/NIM	H/NIM	F/NIM	F/NIM	F/NIM	F/NIM	F/NIM
BOOSTER	BOOSTER	BOOSTER	BOOSTER	BOOSTER	BOOSTER	BOOSTER	SCART
		RF_SW_CTL			RF_SW_CTL	RF_SW_CTL	
SCART			SCART	SCART	CN		
			EU_F/NIM	EU_F/NIM			
			TC_S_F/NIM	TC_S_F/NIM	CN_F/NIM_BR	CN_F/NIM_BR	TC_S_F/NIM

NON_DVB_S: use H/NIM and F/NIM
DVB_S: use DVB-T/C/S2 combo Tuner
H/NIM: use H/NIM
F/NIM: use F/NIM and DVB-T/C/S2 combo Tuner
SCART: use Scart Jack
CN : use China F/NIM
BOOSTER: use BOOSTER_CTL
RF_SW_CTL: use RF_SWITCH_CTL
TC_S_F/NIM: use EU_DVB-T/C F/NIM
CN_F/NIM_BR: use F/NIM(China, BRZIL)
EU_F/NIM: use EU_F/NIM

AU_ASIA_H/NIM_V
TU2201
TDTJ-S131D

EU_F/NIM_DVB_TC_V
TU2202
TDFR-G156D

EU_F/NIM_DVB_TCS_V
TU2203
TDFQ-G031D

	AU_ASIA_H/NIM_V	EU_F/NIM_DVB_TC_V	EU_F/NIM_DVB_TCS_V
1	ANT_PWR	NC_1	NC_1
2	NC_1	BST_CNTL	NC_2
3	+B1[5V]	+B1[5V]	NC_3
4	RF_AGC	NC_2[RF_AGC]	S2_TU[3.3V]
5	MOPLL_AS	NC_3	NC_4
6	SCL	SCLT	TU_SCL
7	SDA	SDAT	TU_SDA
8	NC_2	NC_4	T_1.8V
9	SIF	SIF	T_SIF
10	NC_3	NC_5	NC_5
11	VIDEO	VIDEO	T_CVBS
12	GND	GND	GND_1
13	+B2[1.2V]	+B2[1.2V]	TD_1.2V
14	+B3[3.3V]	+B3[3.3V]	T_3.3V
15	RESET	RESET	T_TU_RESET
16	IF_AGC_CNTL	+B4[2.5V]	NC_6
17	DIF_1[N]	SCL	TD_SCL
18	DIF_2[P]	SDA	TD_SDA
19	SHIELD	ERR	T/C/S2_ERROR
20		SYNC	T/C/S2_SYNC
21		VALID	T/C/S2_VALID
22		MCL	T/C/S2_MCL
23		D0	T/C/S2_D0
24		D1	T/C/S2_D1
25		D2	T/C/S2_D2
26		D3	T/C/S2_D3
27		D4	T/C/S2_D4
28		D5	T/C/S2_D5
29		D6	T/C/S2_D6
30		D7	T/C/S2_D7
31		SHIELD	S2_1.25V
32			S2_RESET
33			S2_3.3V
34			S2_F22
35			S2_SCL
36			S2_SDA
37			GND_2
38			S2_LNB
39			SHIELD

Close to Tuner #38 pin

Surge protectioin

Close to the tuner

ERROR & VALID PIN
<EU, China, Brazil,S2>

Tuner to CI Slot

Vout=0.6*(1+R1/R2)

Max 1.5A

+1.25V_TU (EU)
+1.23V_TU (CN)

Max 217mA

CHBO_TS_CLK
CHBO_TS_SERIAL
CHBO_TS_SYNC
CHBO_TS_VAL_ERR
TU_RESET_SUB
RF_SWITCH_CTL_2
TW9910_RESET

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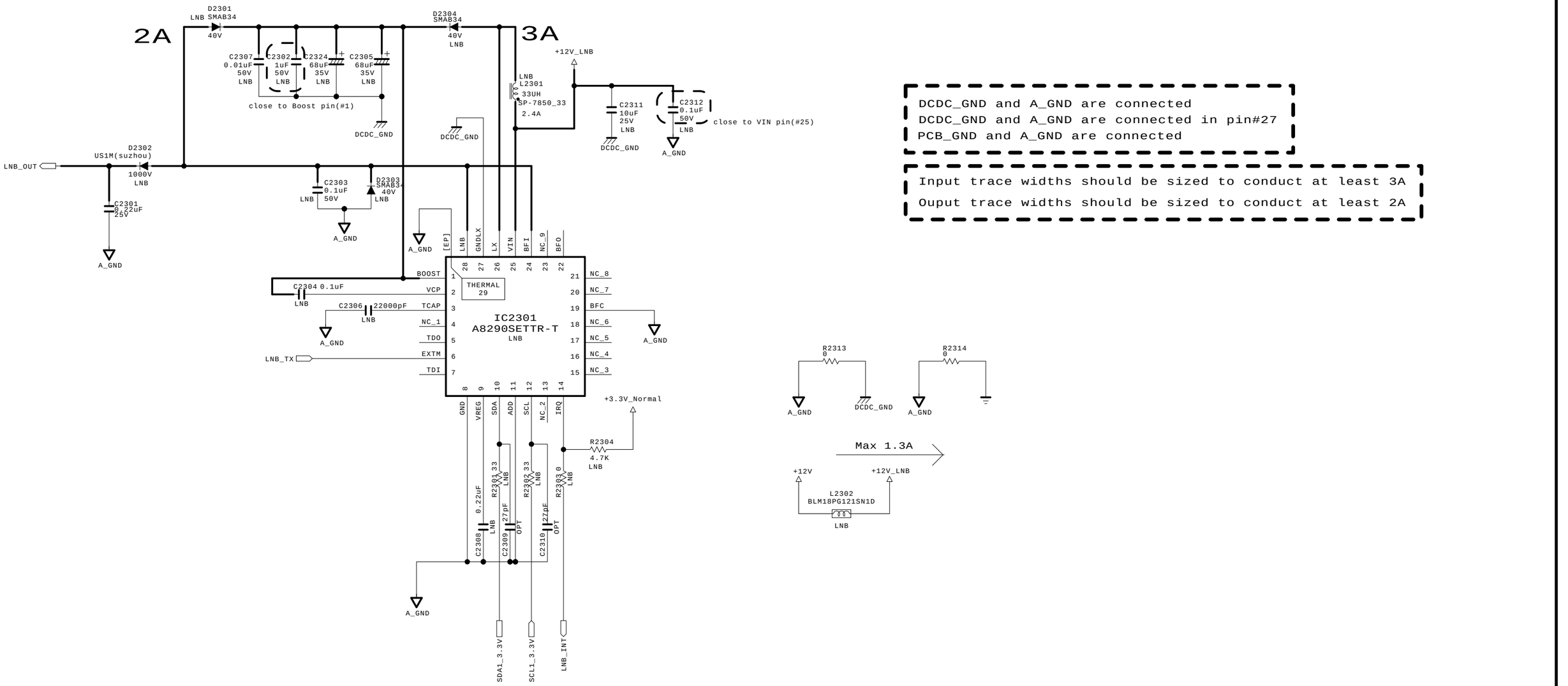
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	TUNER SINGLE	SHEET	22

DVB-S2 LNB Part Allegro

(Option:LNB)



DCDC_GND and A_GND are connected
DCDC_GND and A_GND are connected in pin#27
PCB_GND and A_GND are connected

Input trace widths should be sized to conduct at least 3A

Ouput trace widths should be sized to conduct at least 2A

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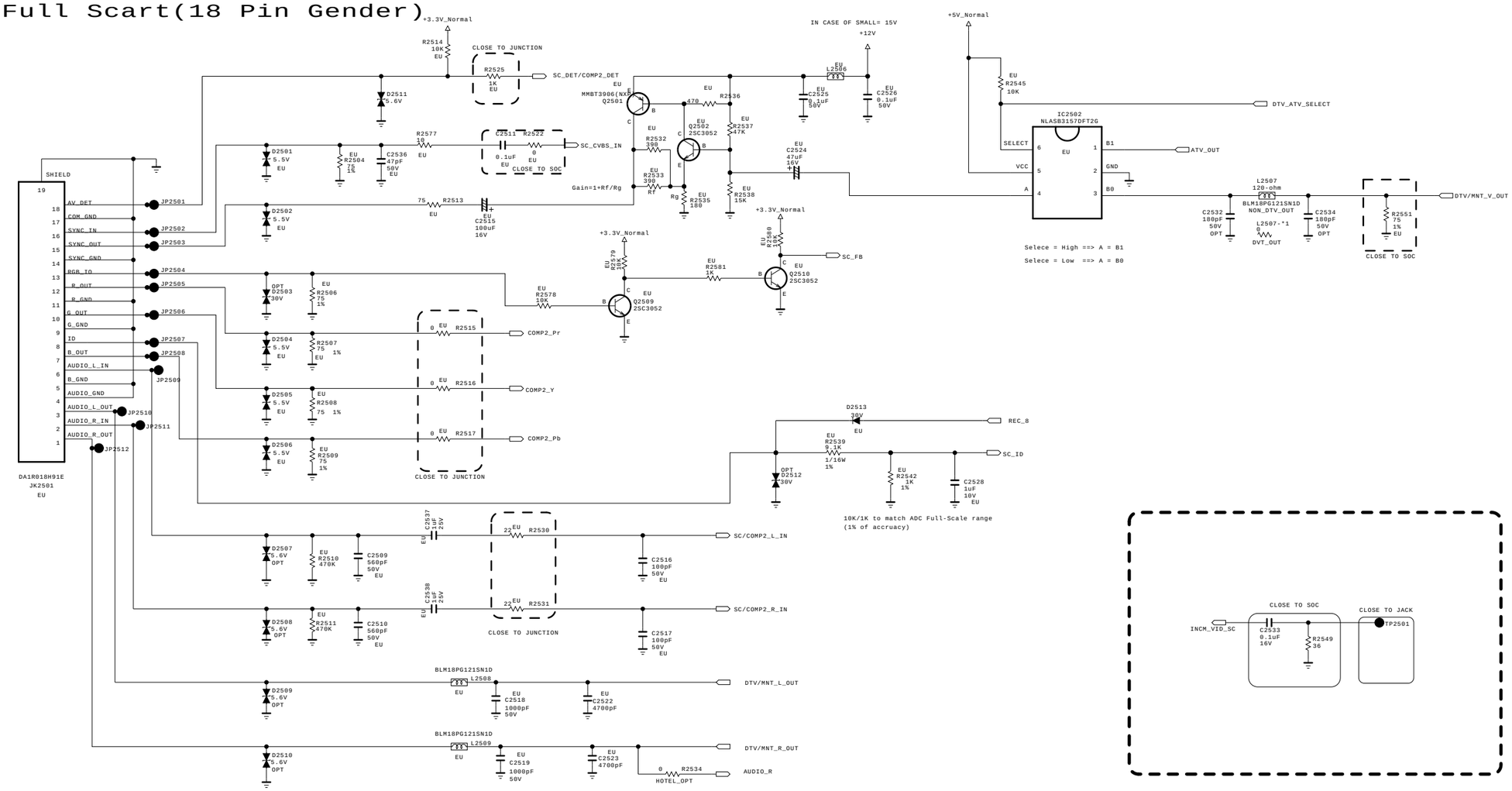
LG ELECTRONICS

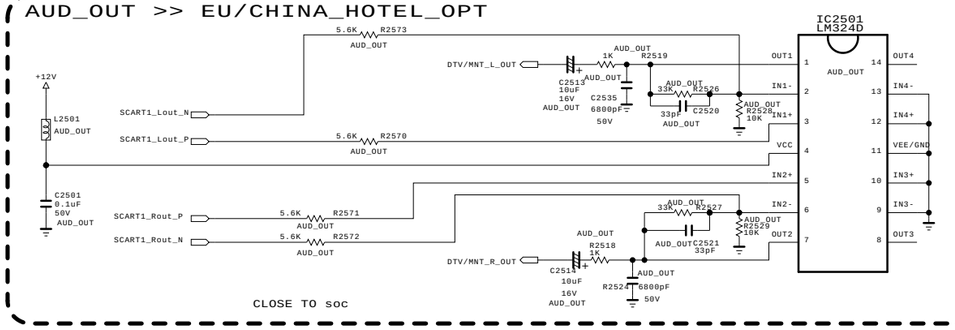
MODEL	BCM35230	DATE	2010.11.02
BLOCK	LNB	SHEET	23 / 57

DUAL COMPONENT	
Q2502,Q2503 Q2504,Q2506 Q2507,Q2508	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q2501	1ST : EBK61012701, 2ND : EBK58172301
Q2505	1ST : 0TRIH80004A, 2ND : EBK61012501, 3RD : 0TR102009AM
D2513	1ST : T-BAT54_SUZHO, 2ND : 0DSON00138A

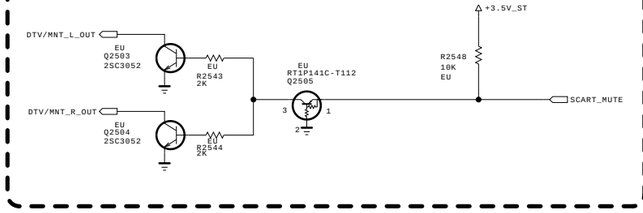
Full Scart(18 Pin Gender)



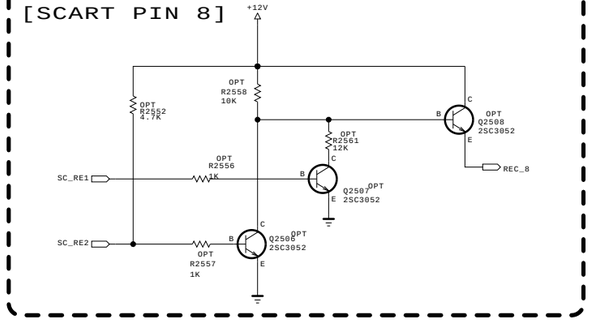
AUD_OUT >> EU/CHINA_HOTEL_OPT



[SCART AUDIO MUTE]



[SCART PIN 8]



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SECRET
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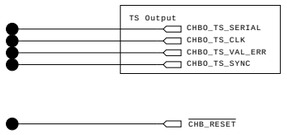
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	SCART	SHEET	25

NON CHB



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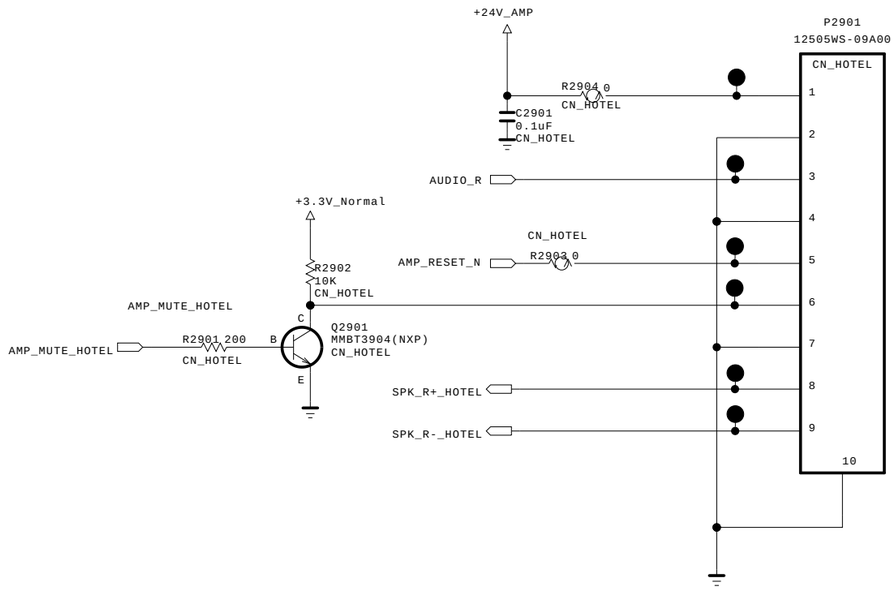
SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	NON CHB	SHEET	28 / 50

China Hotel Option

DUAL COMPONENT	
Q2901	1ST : EBK61012601 2ND : 0TRDI80002A



SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	CHINA HOTEL	SHEET	29

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR
THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

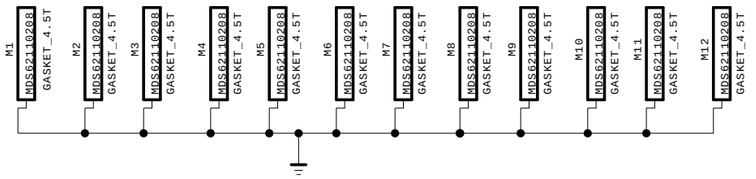
SECRET
LGElectronics

LG ELECTRONICS

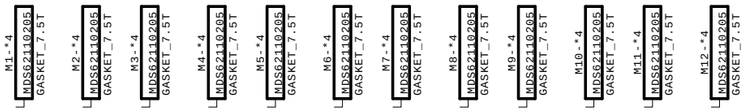
MODEL	BCM35230	DATE	
BLOCK	NON URSA	SHEET	36 / 50

SMD GASKET

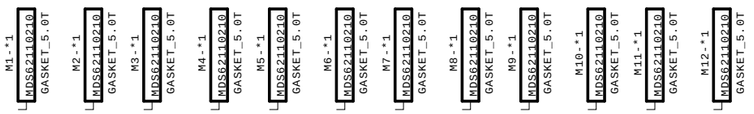
SMD GASKET 4.5T



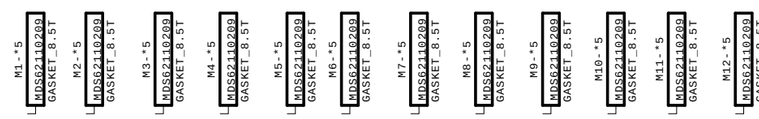
SMD GASKET 7.5T



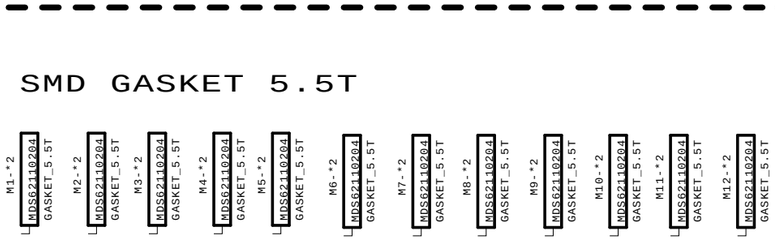
SMD GASKET 5.0T



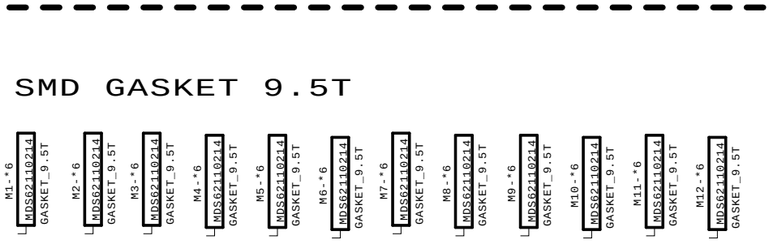
SMD GASKET 8.5T



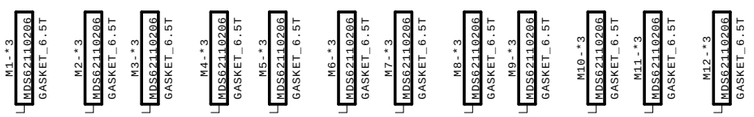
SMD GASKET 5.5T

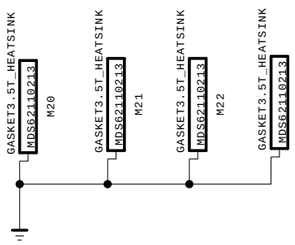


SMD GASKET 9.5T



SMD GASKET 6.5T





THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

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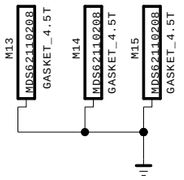
LG ELECTRONICS

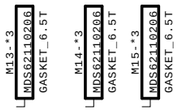
MODEL	BCM35230	DATE	2010. 09. 18
BLOCK	SMD GASKET	SHEET	56 / 56

SMD GASKET (UNDER THE TUNER)

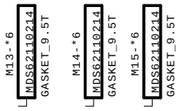
SMD GASKET 4.5T



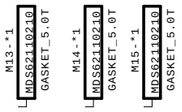
SMD GASKET 6.5T



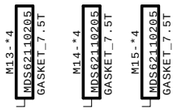
SMD GASKET 9.5T



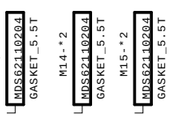
SMD GASKET 5.0T



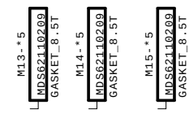
SMD GASKET 7.5T



SMD GASKET 5.5T



SMD GASKET 8.5T



THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

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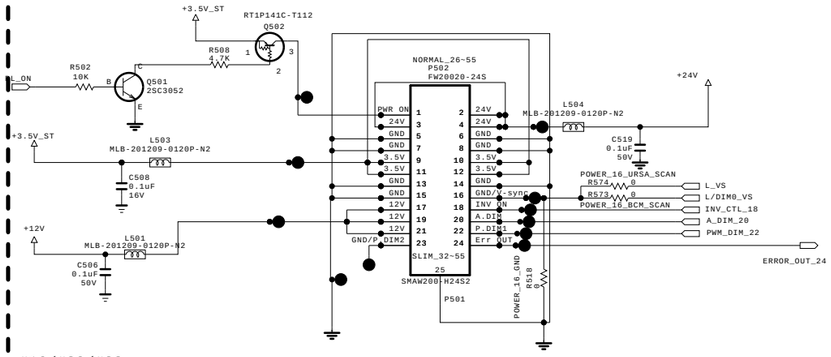
LG ELECTRONICS

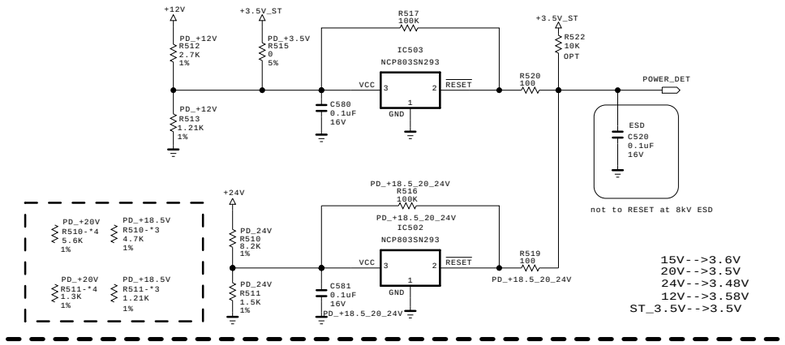
MODEL	BCM35230	DATE	2010. 09. 18
BLOCK	TUNER SMD GASKET	SHEET	57 / 57

FROM LIPS & POWER B/D



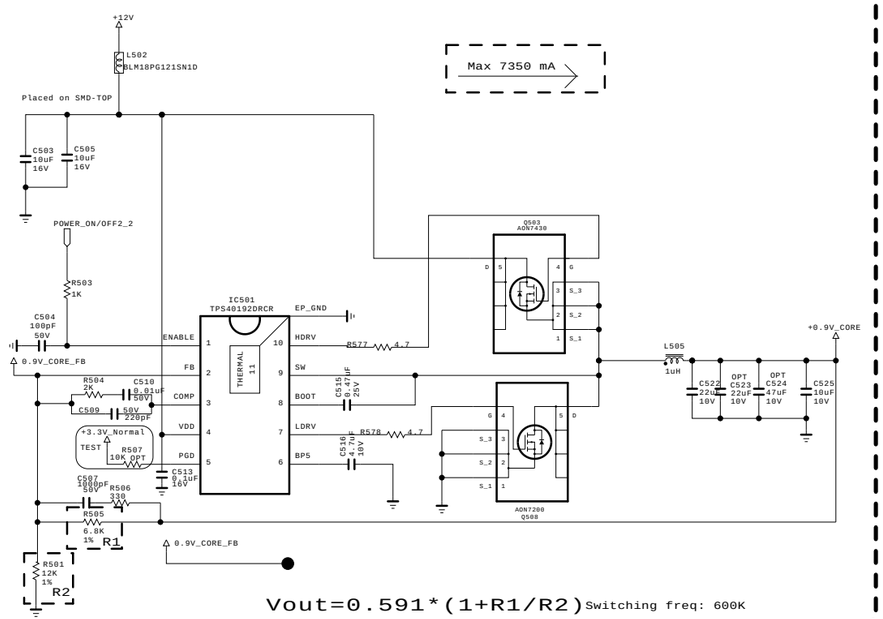
#16/#20/#23
LD - GND OR USE
LE(N.L.D.) - OPEN
LE(L.D.) - USE

Power_DET



15V-->3.6V
20V-->3.5V
24V-->3.48V
12V-->3.58V
ST_3.5V-->3.5V

+0.9V_CORE_BCM35230

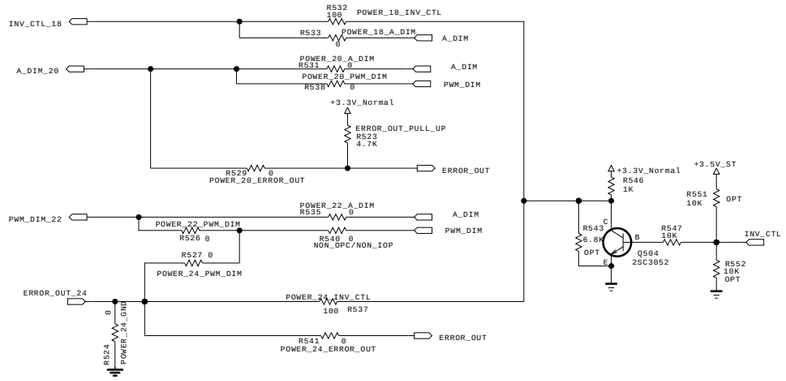


Vout=0.591*(1+R1/R2) Switching freq: 600K

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

DUAL COMPONENT	
Q501,Q504, Q505,Q506	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q502	1ST : 0TRIH80004A, 2ND : EBK61012501, 3RD : 0TR102009AM
Q507	1ST : EBK60752501, 2ND : EBK61011501
IC502,IC503	1ST : EAN61151001, 2ND : EAN60670101

OS Module OPT



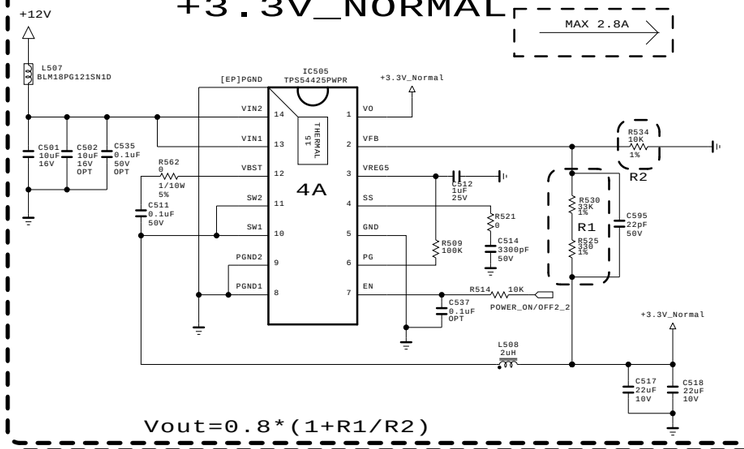
<OS MODULE PIN MAP>

PIN No	LGD	CMO(09)	AUO	SHARP
18	INV_ON	A-DIM	INV_ON	INV_ON
20	V4:VBR-A V5:NC	NC	Err_out	Err_out
22	PWM_DIM	PWM_DIM	A-DIM	PWM_DIM
24	Err_out LED:GND	INV_ON	PWM_DIM	GND

CHECK PWR/MODULE PIN MAP

+3.3V_NORMAL

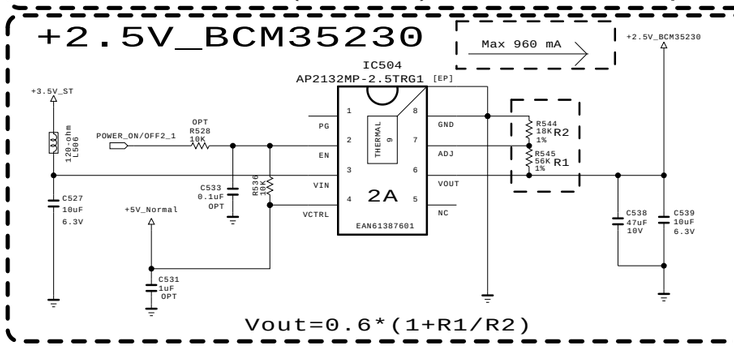
Max 2.8A



Vout=0.8*(1+R1/R2)

+2.5V_BCM35230

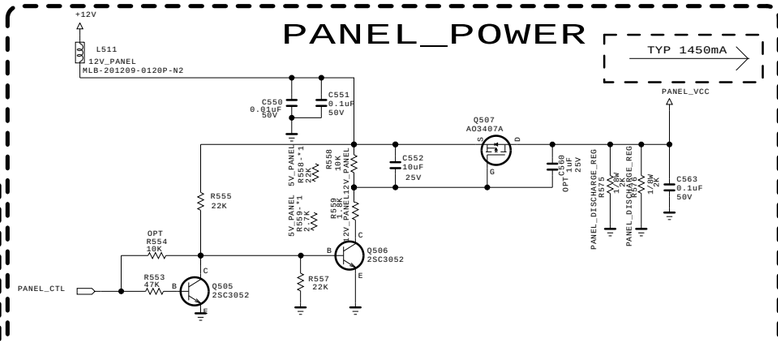
Max 960 mA



Vout=0.6*(1+R1/R2)

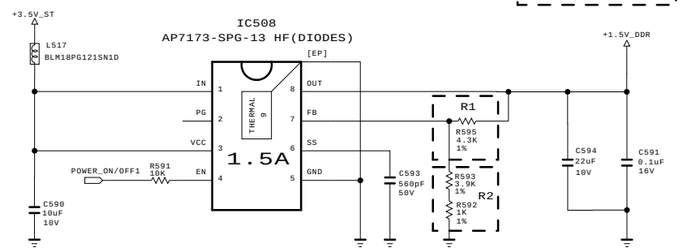
PANEL_POWER

TYP 1450mA



+1.5V_DDR

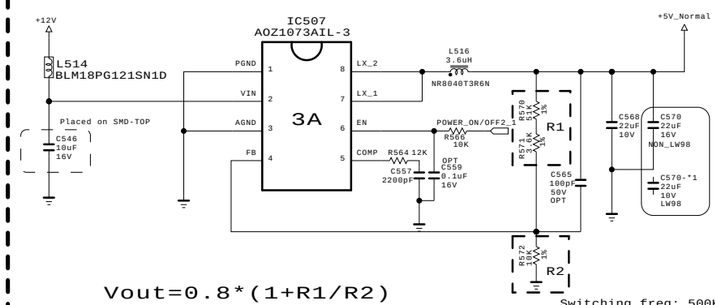
Max 800mA



Vout=0.8*(1+R1/R2)

+5V_Normal

MAX 1A

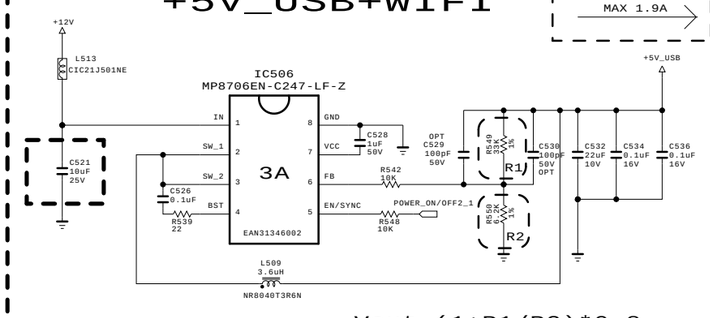


Vout=0.8*(1+R1/R2)

Switching freq: 500K

+5V_USB+WIFI

MAX 1.9A



Vout=(1+R1/R2)*0.8

Vout=0.8*(1+R1/R2)

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	POWER	SHEET	5 / 58

LGE Internal Use Only


LG Electronics Inc.

LCD TV Repair Guide

`11 years New Models

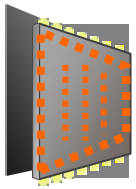
< Applicable Model >

XXLW980T/W/S/G-ZA
XXLW950T/W/S/G-ZA
XXLW770T/W/S/G-ZA
XXLW650W/S/G-ZC
XXLW570S/G
XXLW550T/W

T : UK T2/C
W : Nordic T2/C
S : Satellite
G : MHP

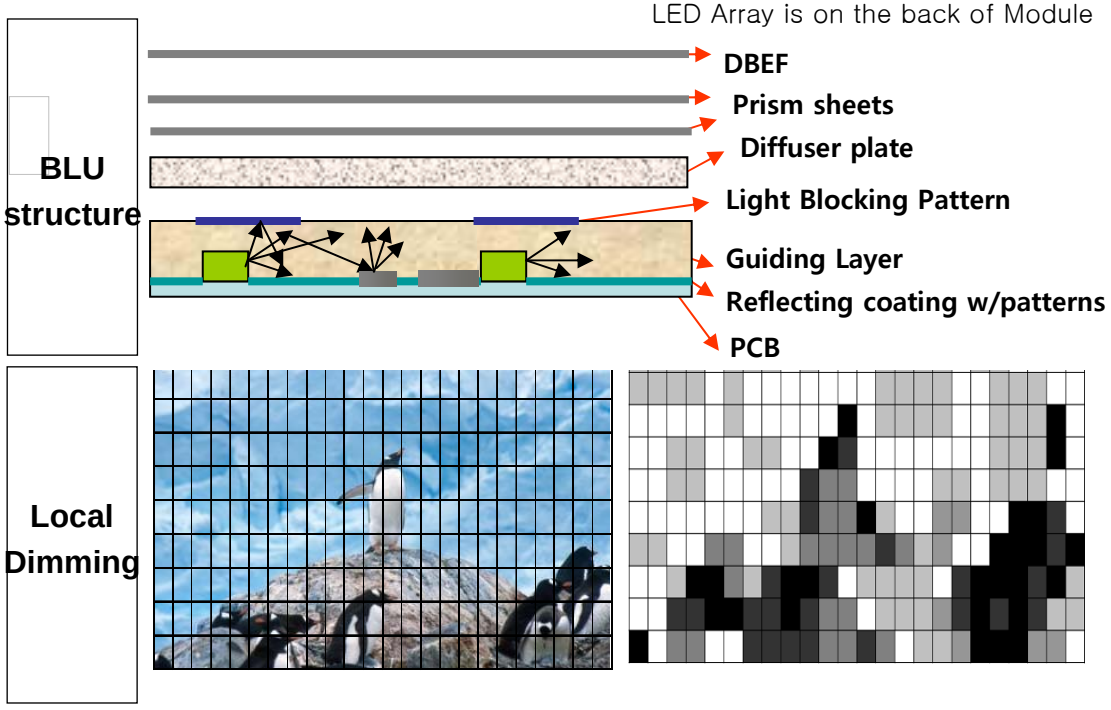
2 types of LED - ALEF

Benefit: More Clear More Real



ALEF Type
Local Dimming

LED Array is on the back of Module



Feature

ALEF LED	Best picture quality + thin TV Slimmer depth better picture quality
Local Dimming	Local dimming depicts more deep black.

Model

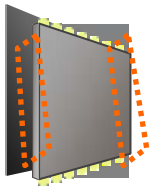
XXLW950T/W/S/G
47inch : H(24) * V(10) = 240Block
55inch : H(24) * V(12) = 288Block

XXLW770T/W/S/G
42inch : H(12) * V(4) = 48Block
47inch : H(12) * V(5) = 60Block
55inch : H(16) * V(6) = 96Block

XXLW980T/W/S/G
47inch : H(8) * V(9) = 72Block
55inch : H(8) * V(12) = 96Block

2 types of LED - Edge

Benefit: More Clear More Real

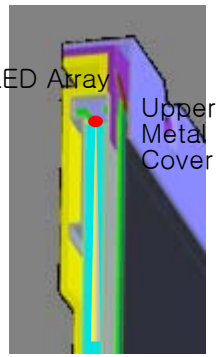


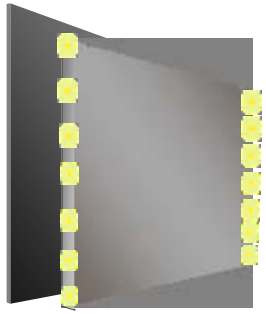
Edge Type
w/ Local Dimming

Feature

Edge LED	Best picture quality + thin TV
Local Dimming	Local dimming depicts more deep black.

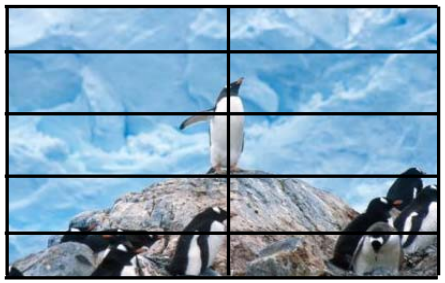
BLU structure

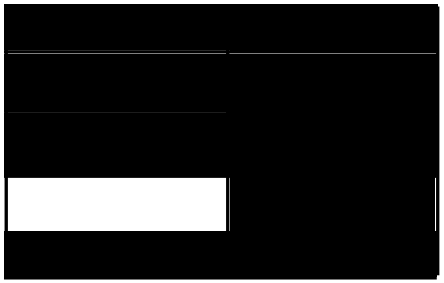




LED Array is on the side of Module

Local Dimming





Model

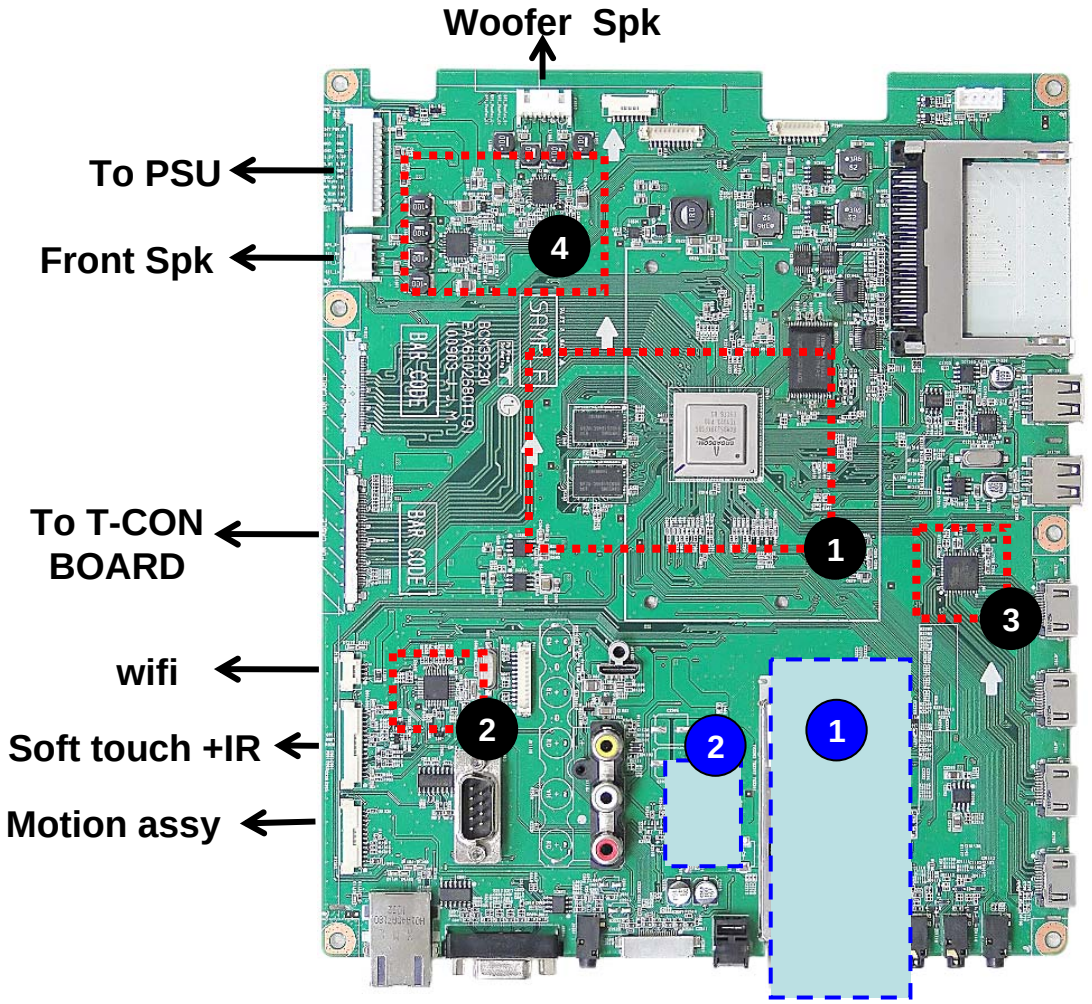
XXLV5500/T/W/G-ZA
XXLV570G/S-ZA
XXLW550T/W/S-ZA
XXLW650W/G/S-ZA
XXLW570G/S-ZA

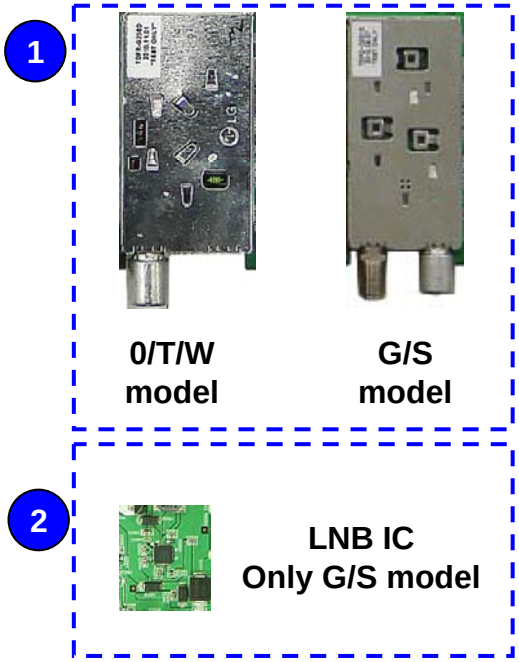
32inch : H(2) * V(5) = 10Block
37inch : H(2) * V(5) = 10Block
42inch : H(2) * V(8) = 16Block
47inch : H(2) * V(8) = 16Block
55inch : H(2) * V(8) = 16Block

Main PCB for Smart TV

Main Board without T-con b'd

XXLW980T/W/G/S-ZA
XXLW950T/W/G/S-ZA
XXLW770T/W/G/S-ZA



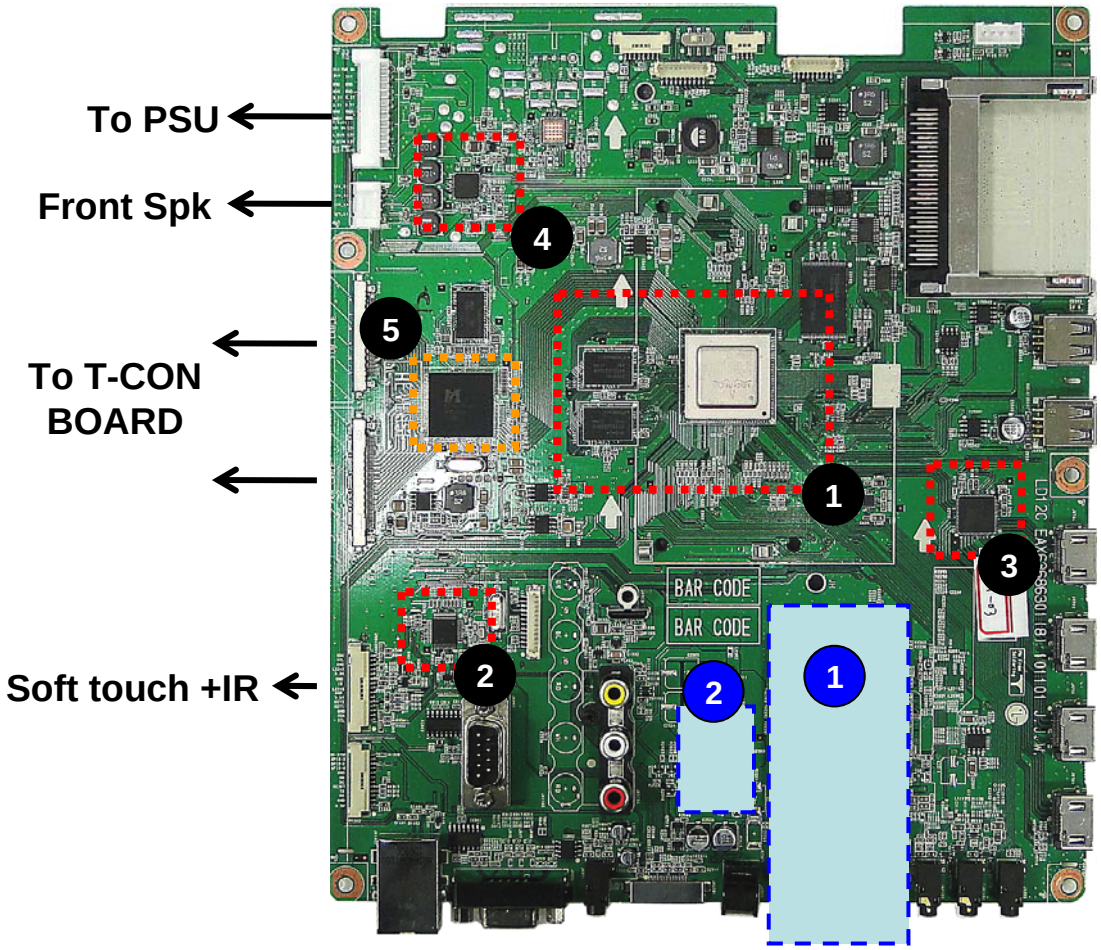


1. Main processor, DDR Memory Flash Memory
2. Micom for Key/IR sensing
3. HDMI switch (4:1)
4. Audio AMP (10W+10W)

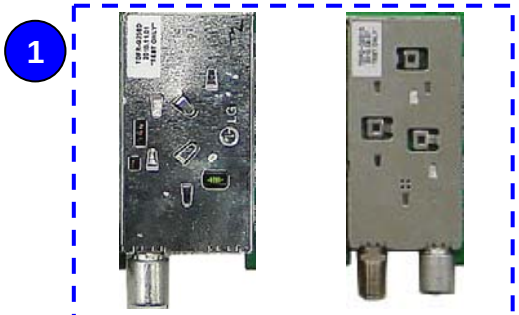
Tuner type can be changed by the model name.

Main PCB for Broadband

XXLW5500/T/W/S-ZA
XXLW650W/G/S-ZA
XXLW570G/S-ZA



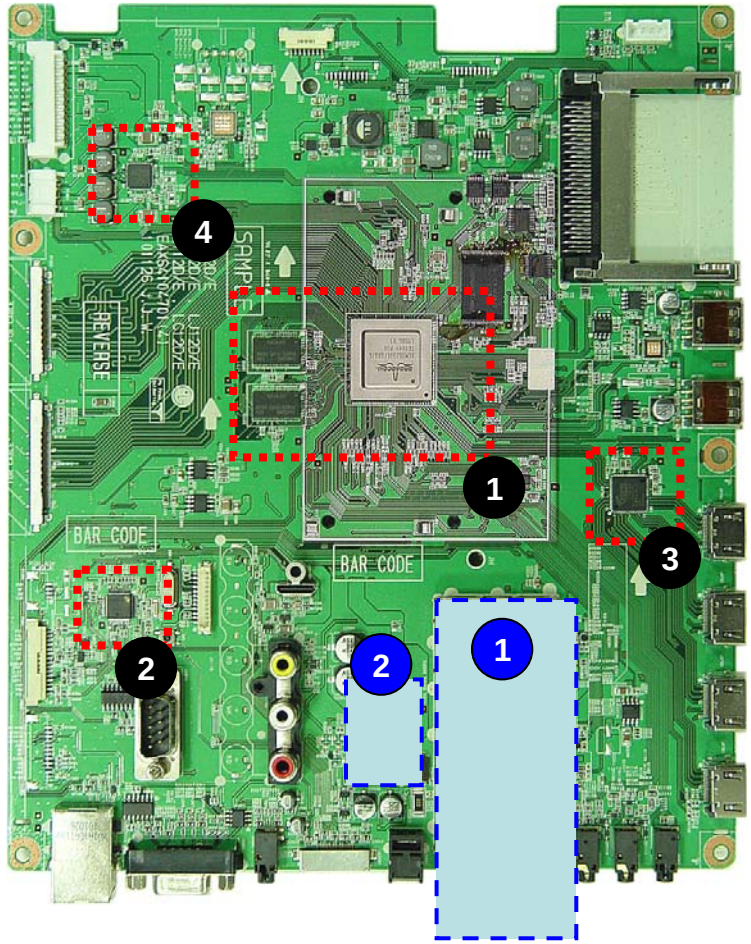
Main Board without T-con b'd



1. Main processor, DDR Memory Flash Memory
2. Micom for Key/IR sensing
3. HDMI switch (4:1)
4. Audio AMP (10W+10W)
5. URSA5 External FRC

Main PCB for Broadband

XXLV5500/T/W/G-ZA
XXLV570G/S-ZA



Main Board without T-con b'd

1

0/T/W model name

G/S model name

2

LNB IC
Only G/S model

1 Main processor, DDR Memory Flash Memory

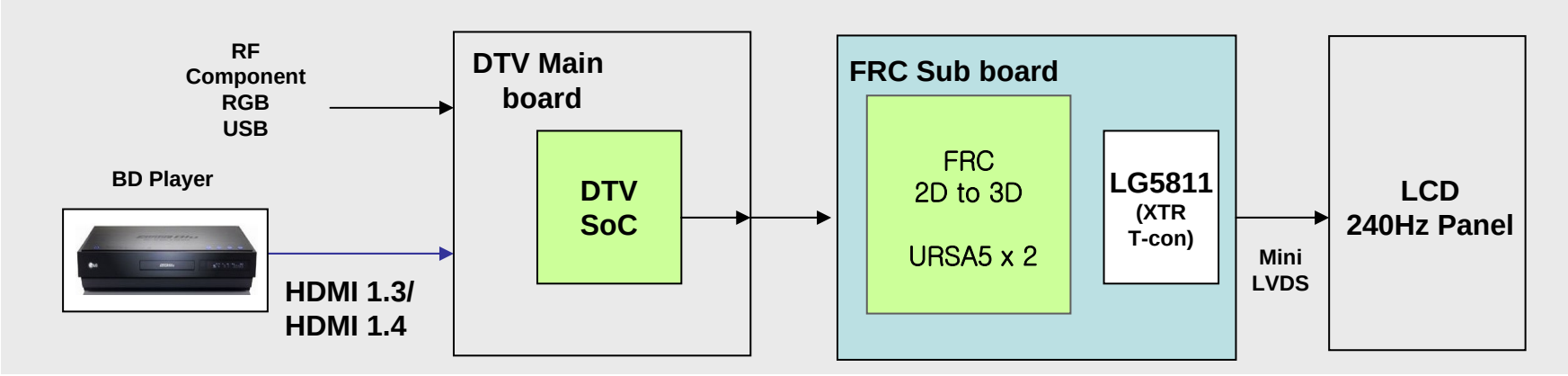
2 Micom for Key/IR sensing

3 HDMI switch (4:1)

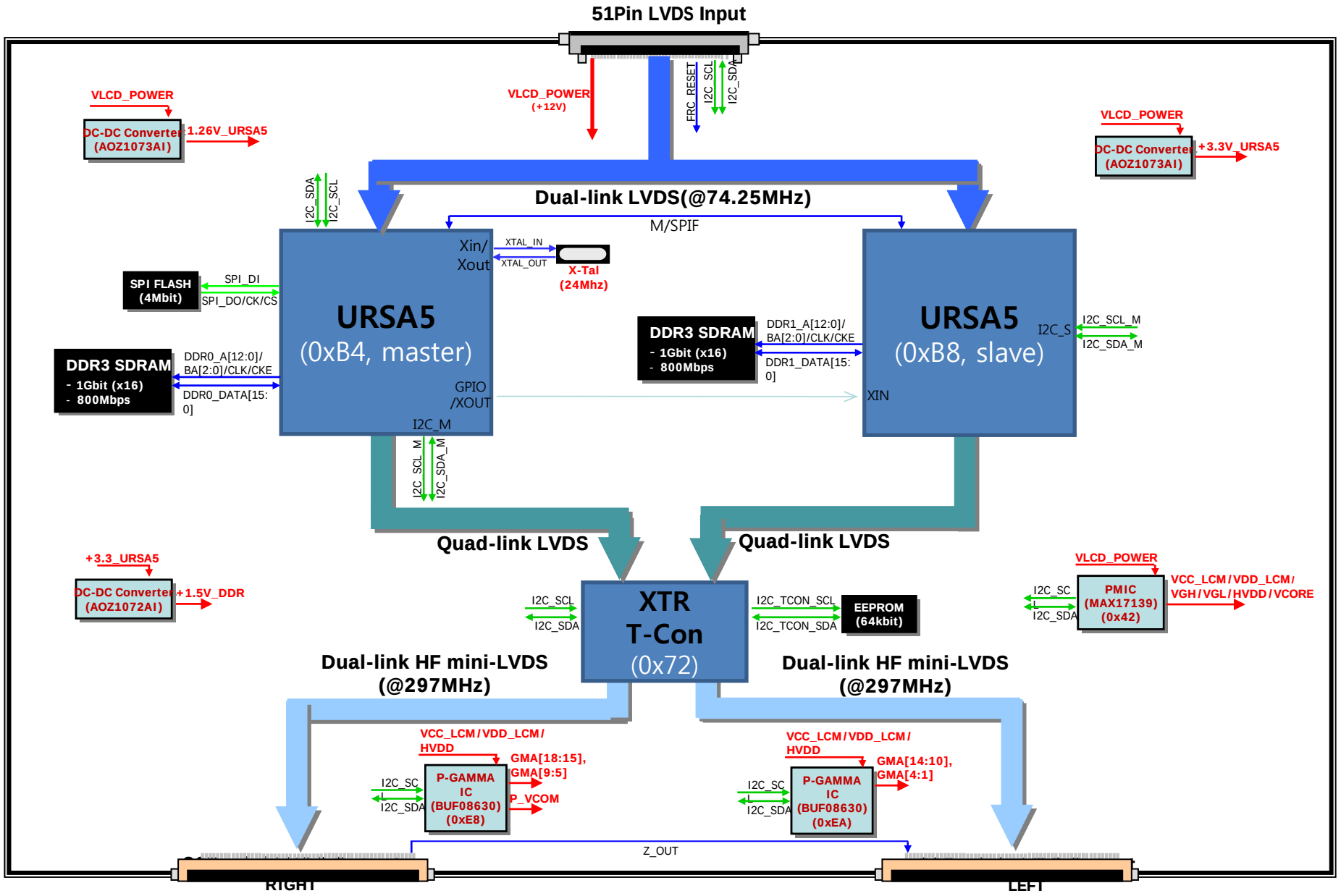
4 Audio AMP (10W+10W)

3DTV System

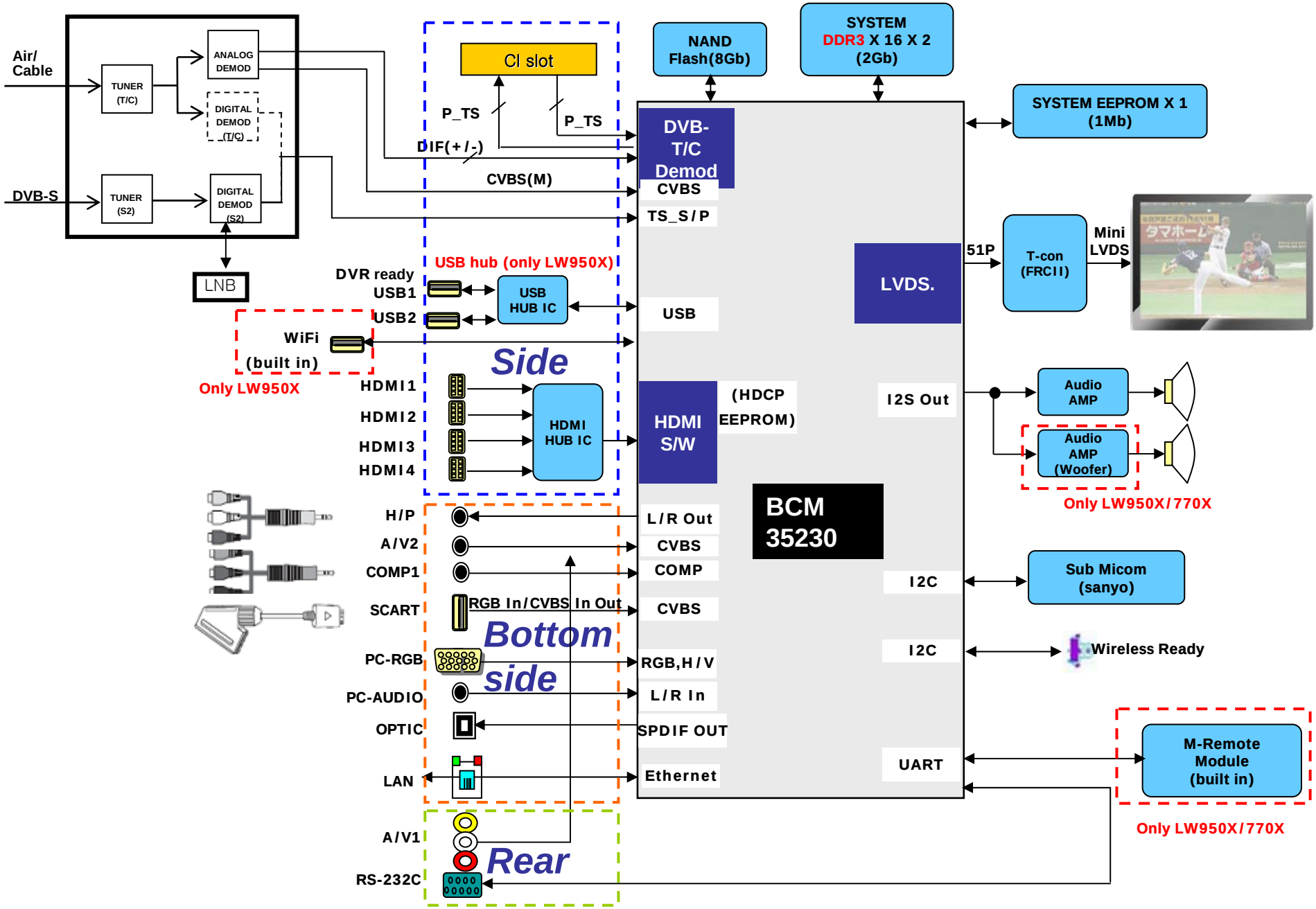
❖ Passive Type (LW98)



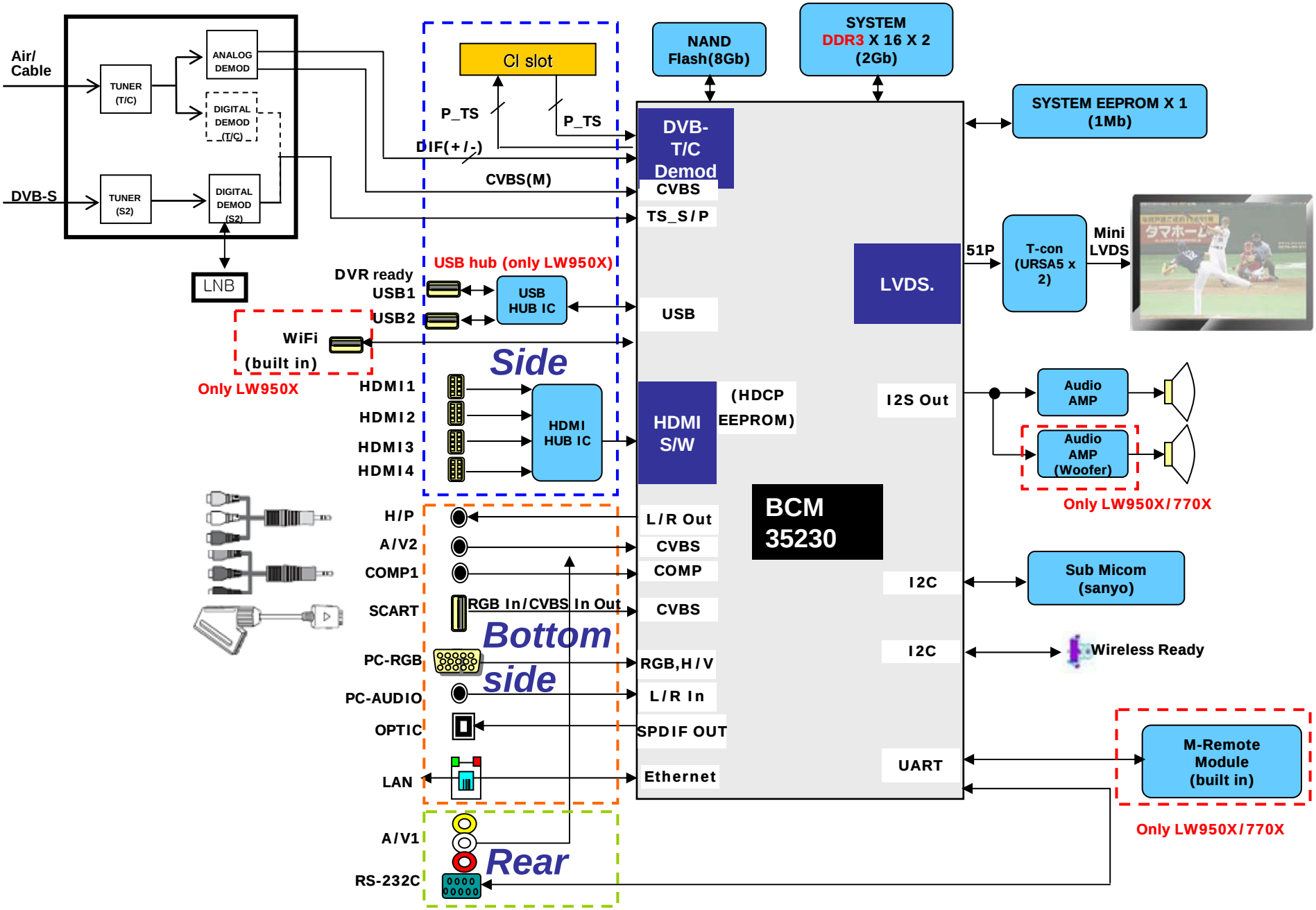
GP3 Backend block diagram (LW98 PG)



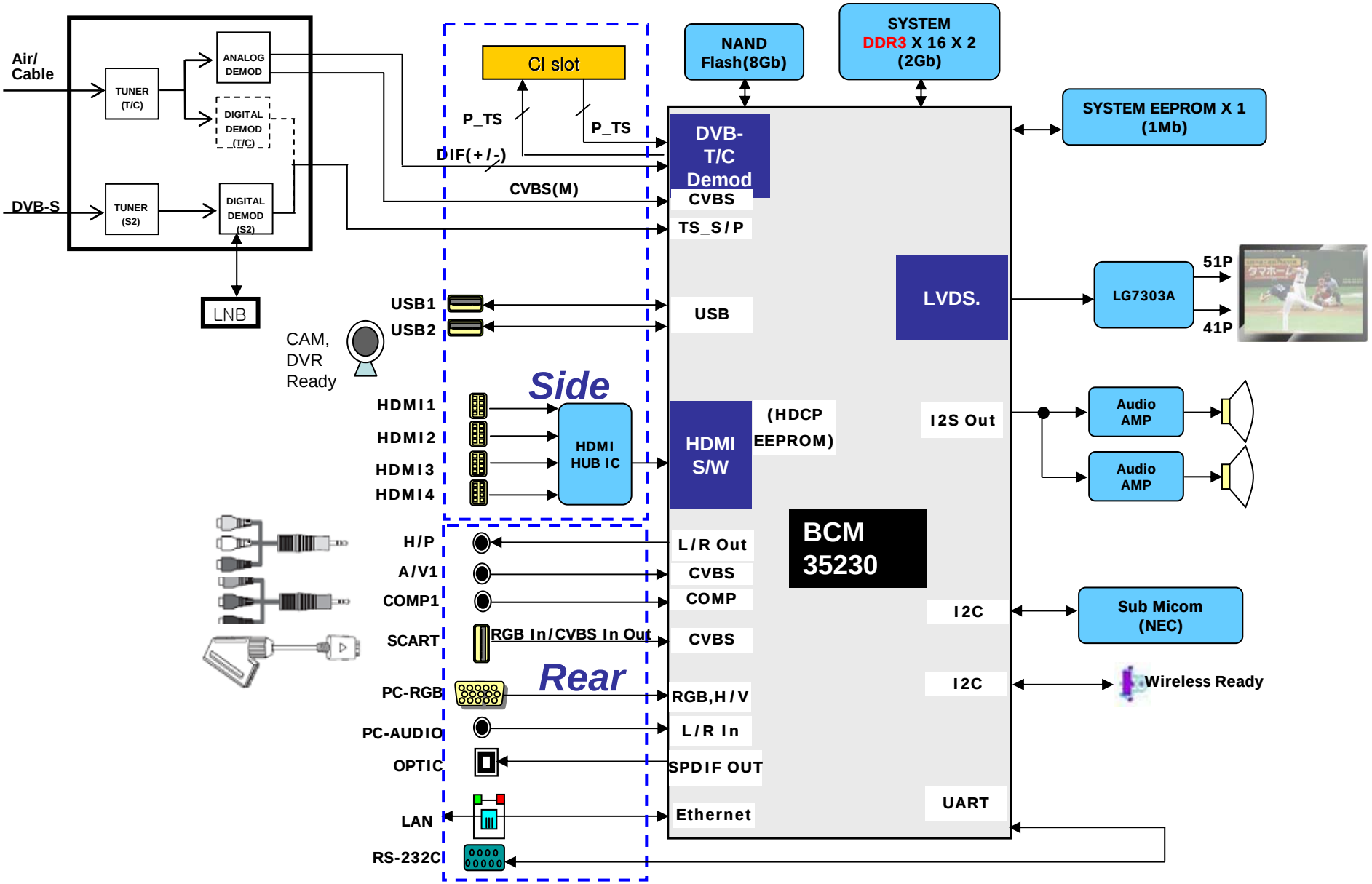
BCM35230 Block Diagram (SG LW95/77, LV55/57))



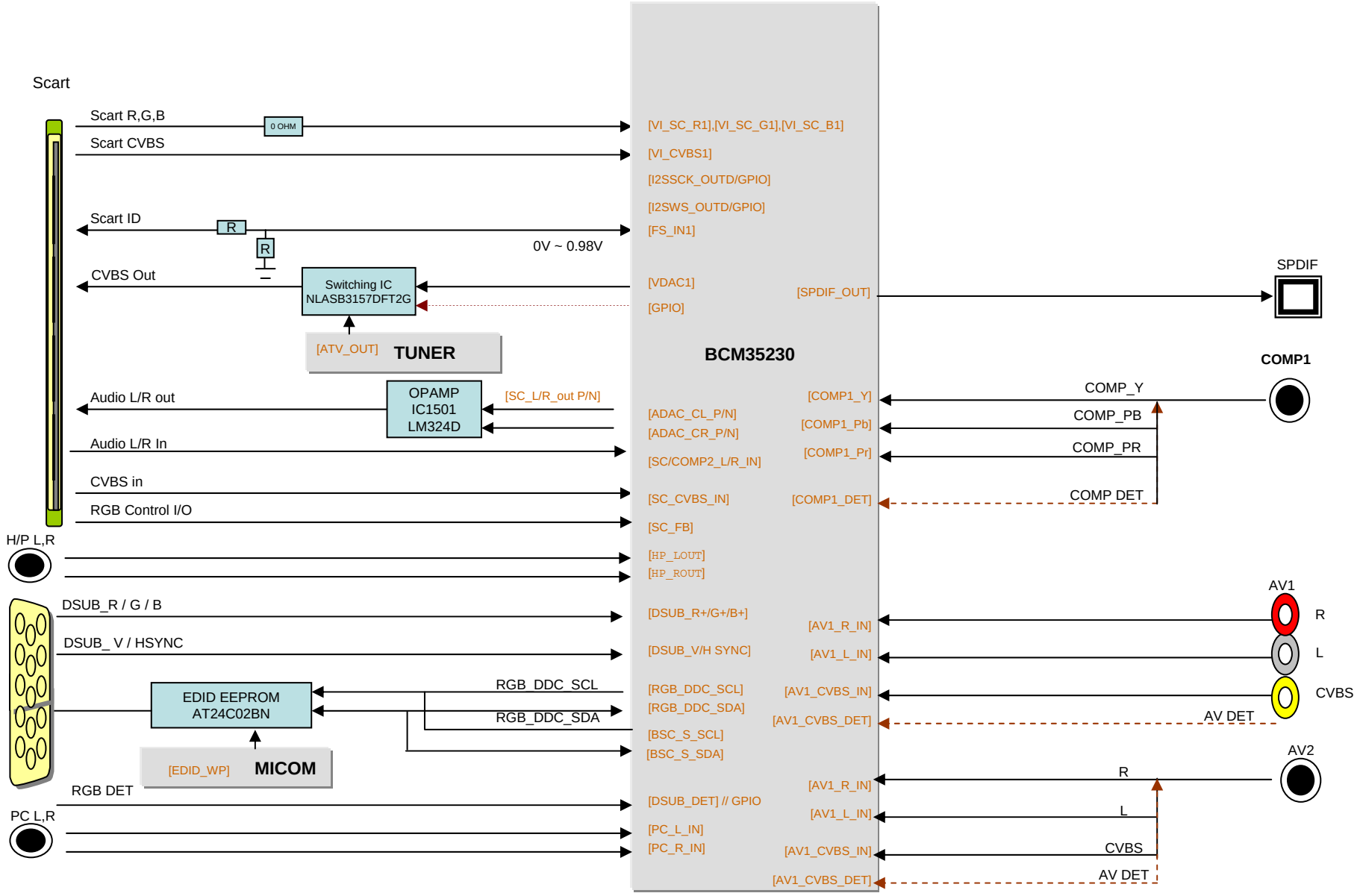
BCM35230 Block Diagram (LW98)



BCM35230 Block Diagram (PG))

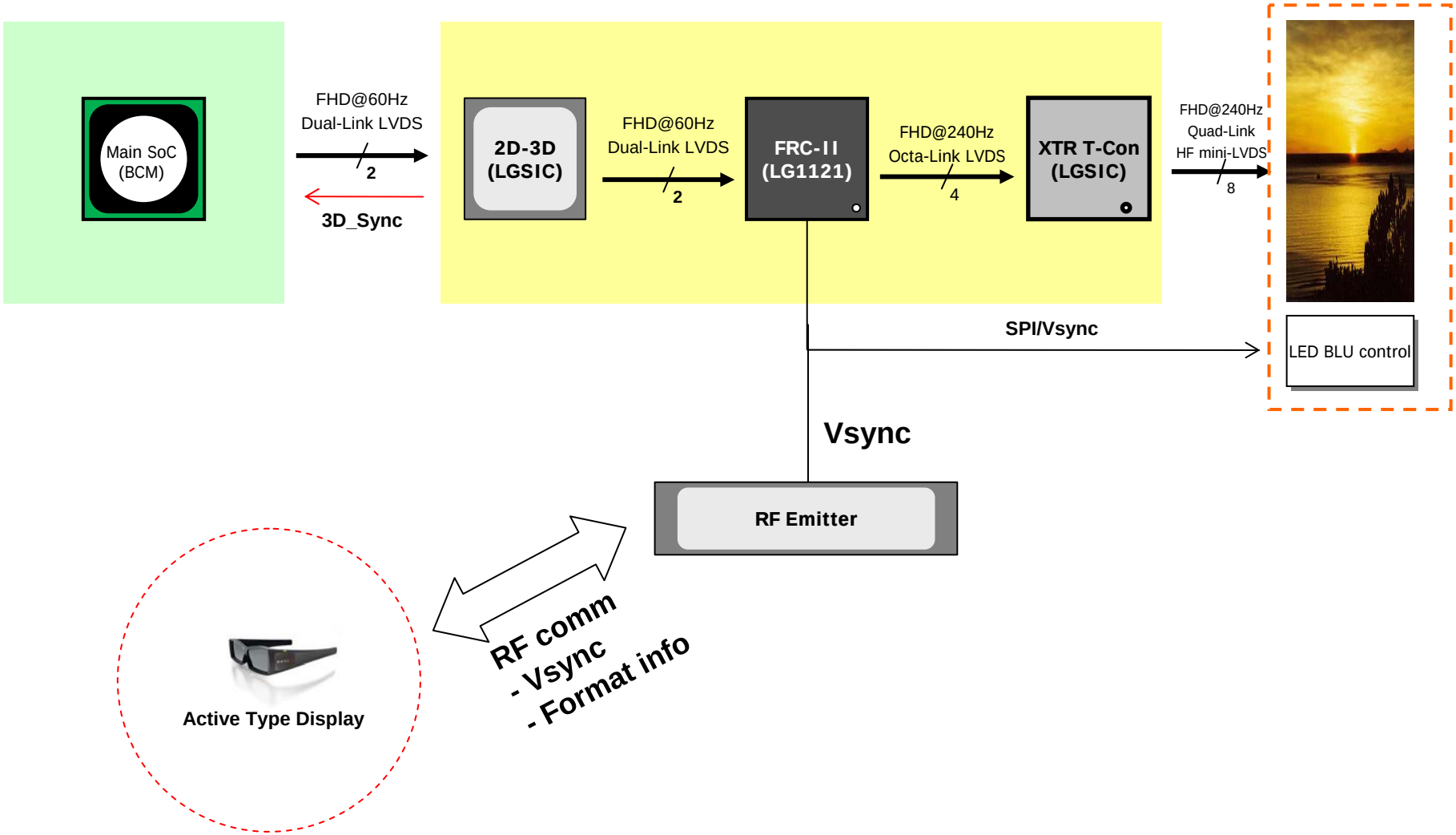


Jack Interface



Appendix. Block Diagram for Edge/ALEF Backlight

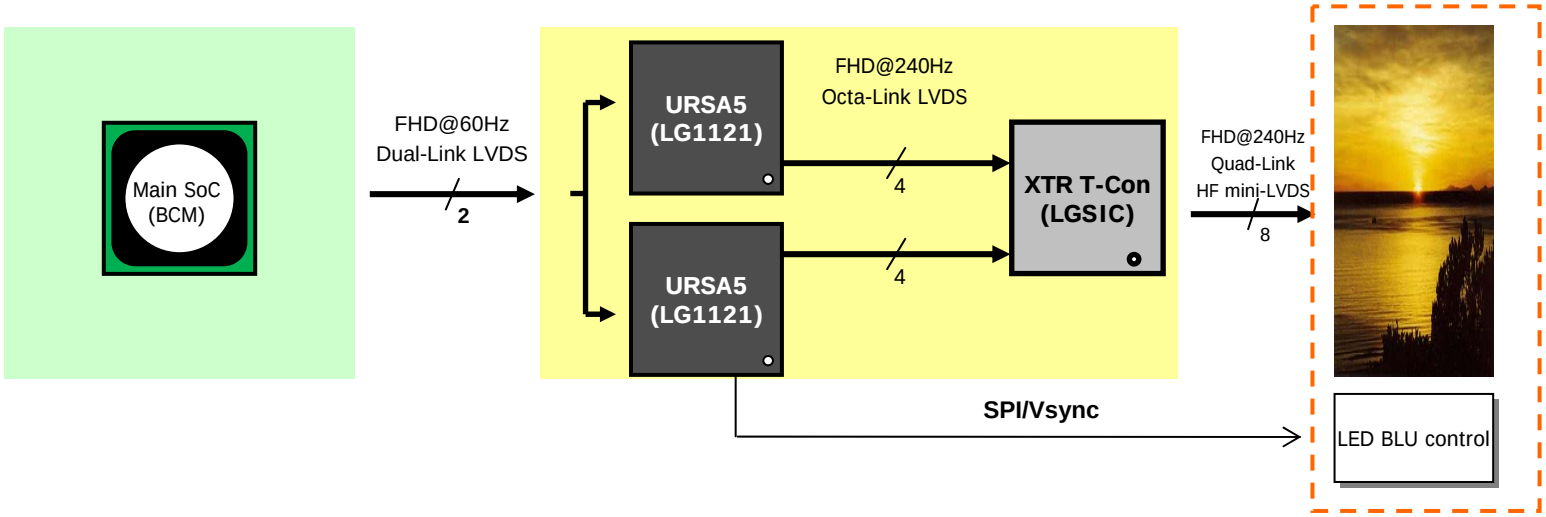
[All in one main PCB for XXLW950T/W/S/G,XXLW770T/W/S/G ALEF LED Backlight]



*** For more information about 3D system, refer to the page 1 ~6**

Appendix. Block Diagram for ALEF Backlight

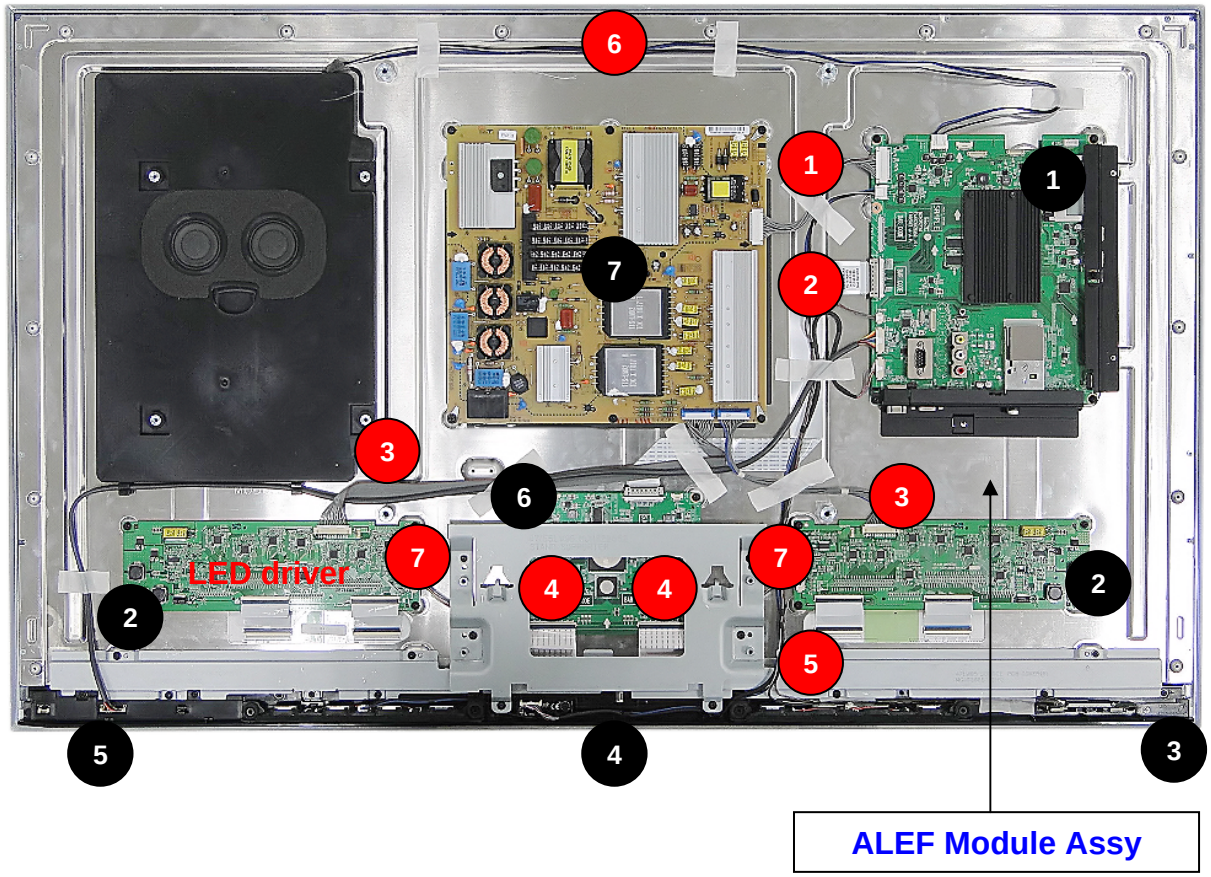
[All in one main PCB for **XXLW980T/W/S/G** ALEF LED Backlight]



*** For more information about 3D system, refer to the page 1 ~6**

Interconnection - 1

XXLW950T/W/S/G-ZA
XXLW980T/W/S/G-ZA



[PCBs]

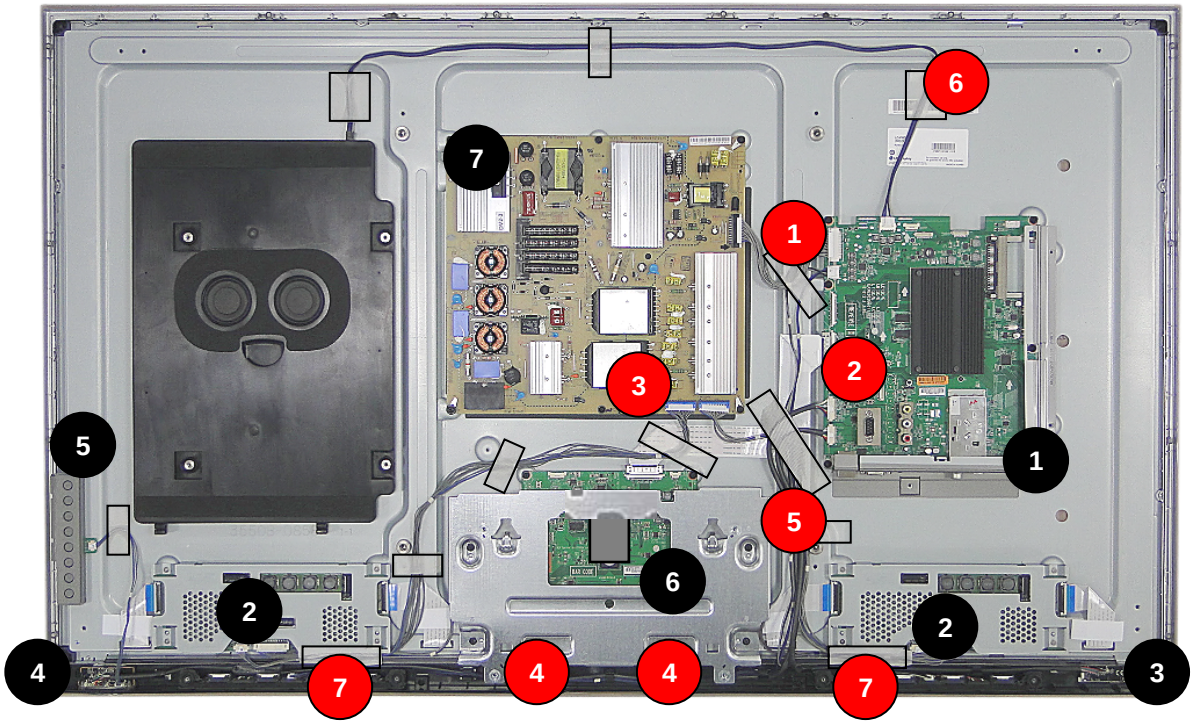
1. Main PCB
2. LED driver
3. WIFI ASSY
4. RF MOTION ASSY
5. Soft Touch + IR Key PCB
6. T-CON ASSY
7. PSU

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable 51PIN
3. LED driver / PSU
4. T-CON to Module 80pin FFC
5. Multi-cable: IR+MOTION+WIFI +SPK
6. WOOFER SPK CABLE
7. Local dimming cable 8pin

Interconnection - 2

XXLW770T/W/S/G-ZA



[PCBs]

1. Main PCB
2. LED driver
3. RF MOTION ASSY
4. IR Key PCB
5. Control key
6. T-CON ASSY
7. PSU

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable 51PIN
3. LED driver / PSU
4. T-CON to Module 80pin FFC
5. Multi-cable:
   IR+MOTION +SPK
6. WOOFER SPK CABLE
7. Local dimming cable 8pin

Interconnection – sub PCB(LW950/LW980 Series)

5 Soft Touch + IR Key PCB
(15pin)

4 RF MOTION ASSY
(12pin)

SPK unit

3 WIFI ASSY
(4pin)

Soft Touch
IR Key PCB
(15pin)

RF MOTION ASSY
(12pin)

WIFI ASSY
(4pin)

1
To Main

Interconnection – sub PCB(LW770 Series)

4
IR Key PCB
(15pin)

3
RF MOTION ASSY
(12pin)

SPK unit

Control key

(4pin)

IR Key PCB

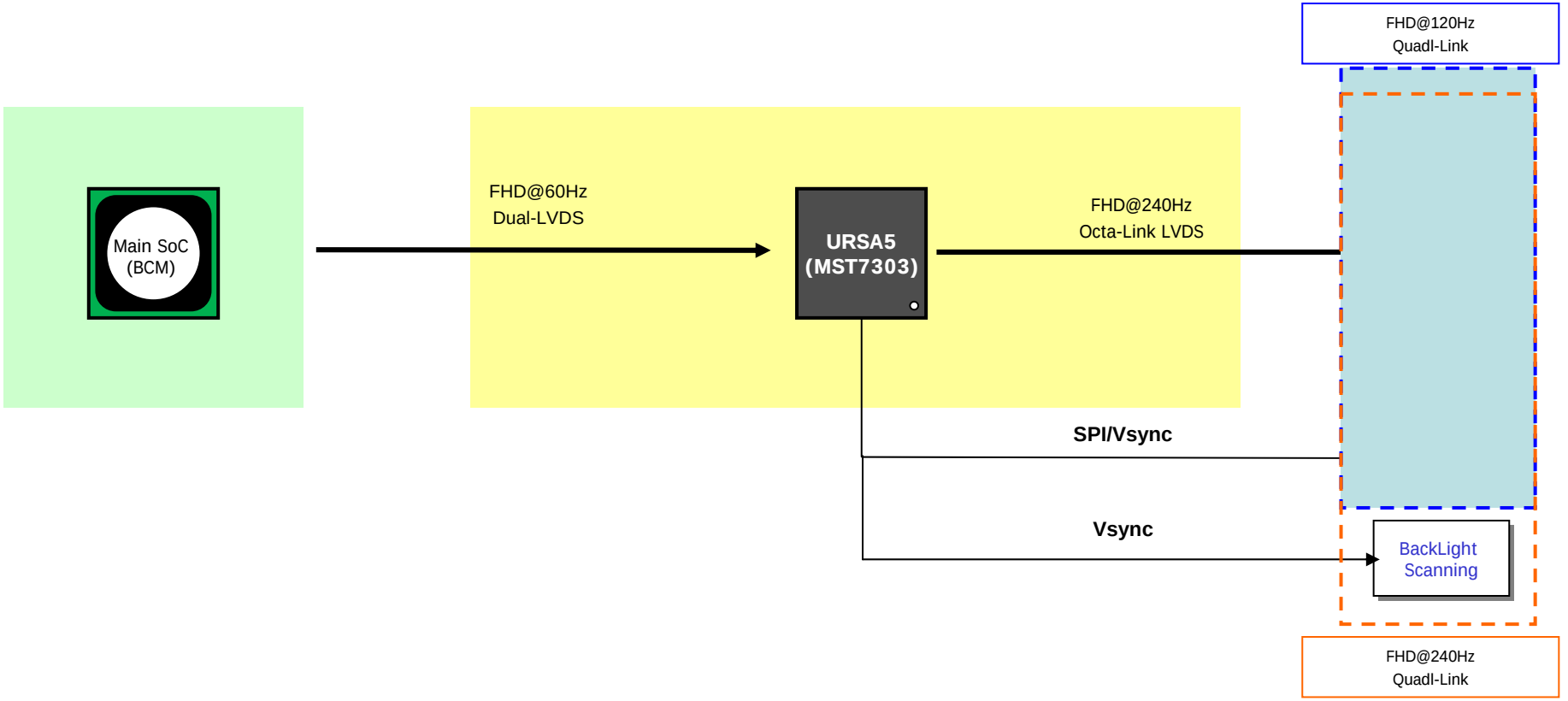
(15pin)

RF MOTION ASSY

(12pin)

1
To Main

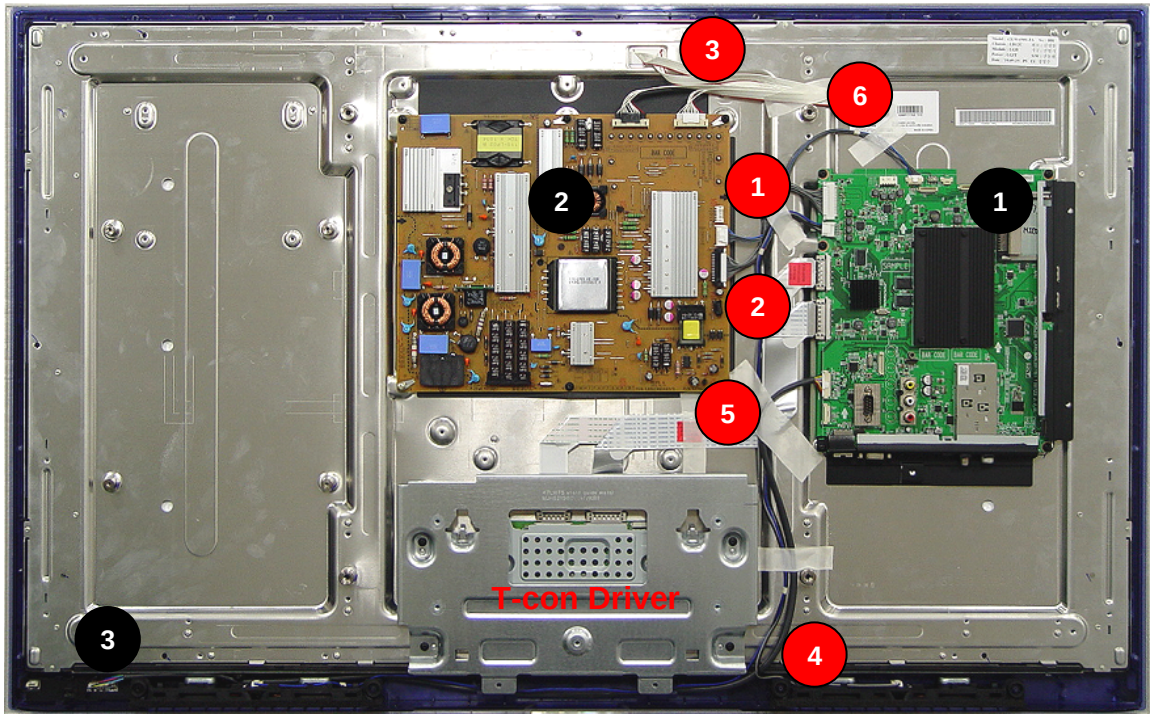
Appendix. Block Diagram for Edge Backlight



[All in one main PCB for XXLW650W/S/G 240Hz & XXLW550T/W/S,XXLW570G/S 120Hz]

Interconnection - 1

XXLW550T/W/S-ZA
XXLW650W/G/S-ZA
XXLW570G/S-ZA



[PCBs]

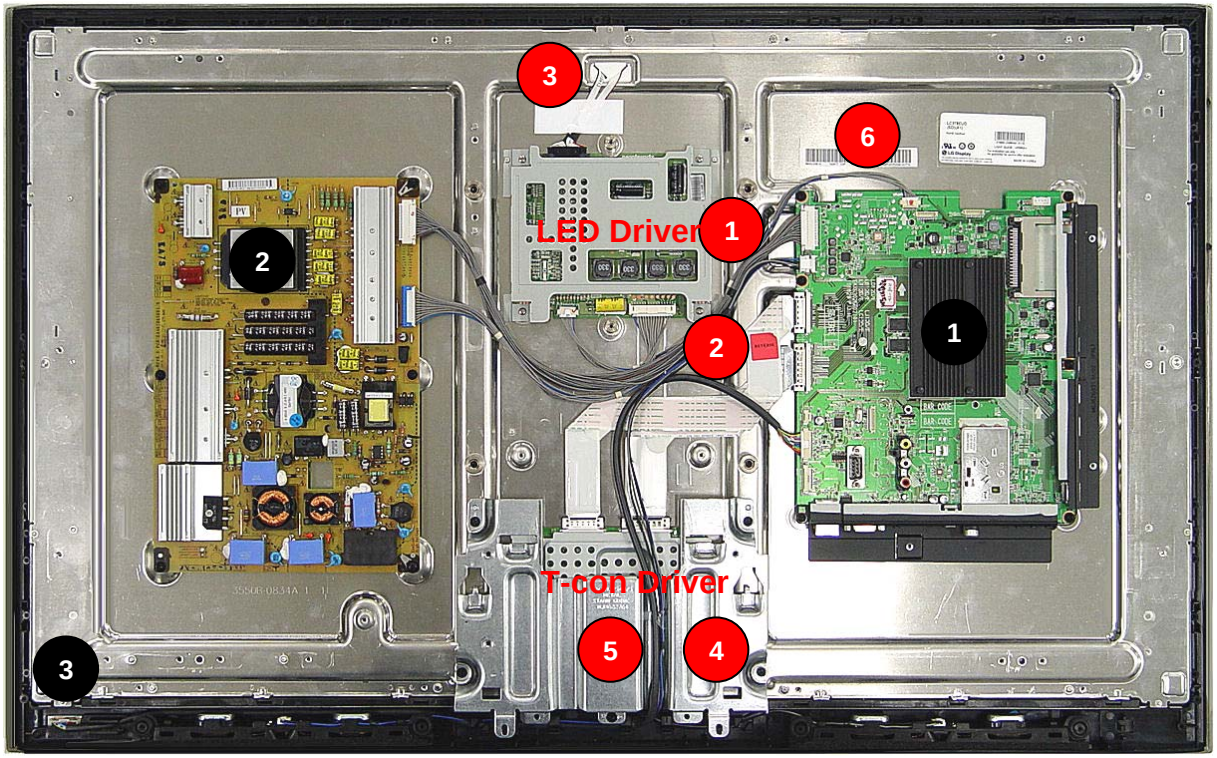
1. Main PCB
2. Power Board
3. Soft touch + IR Key PCB

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable 41&51PIN
3. LED driver / PSU
4. 15Pin (IR+Touch) Cable
5. SPK Cable
6. Local Dimming Cable

Interconnection - 2

32/37LV5500/T/W/G-ZA
32/37LV570G/S-ZA



[PCBs]

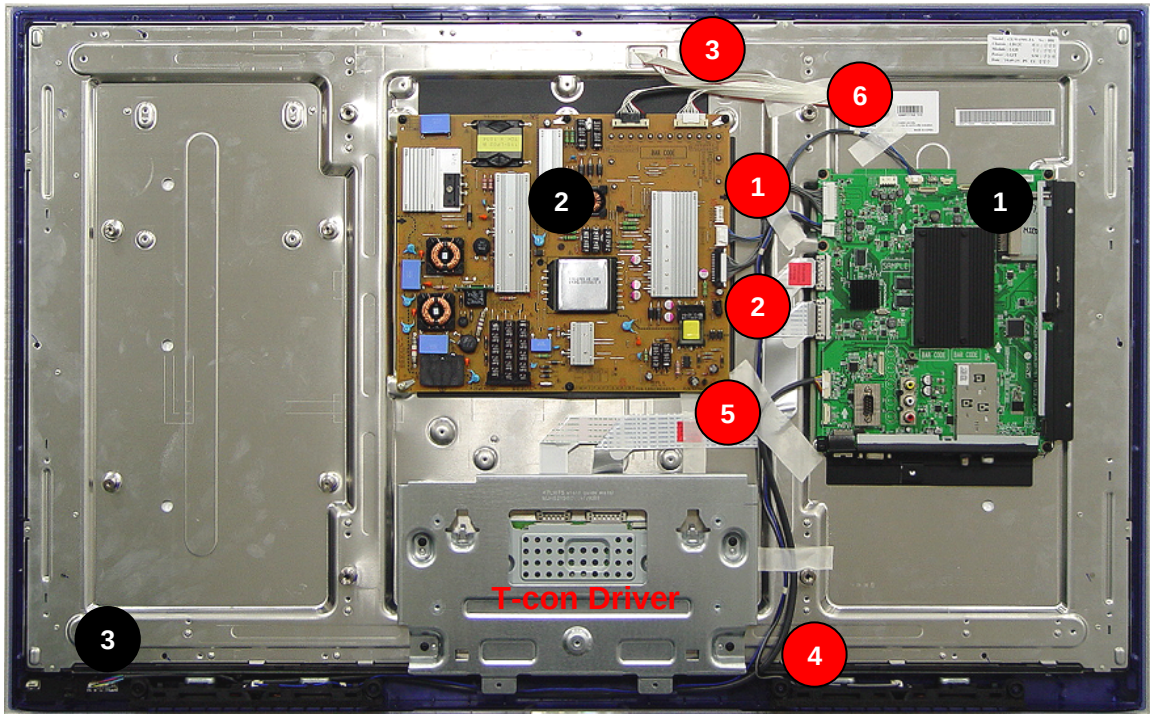
1. Main PCB
2. Power Board
3. Soft touch + IR Key PCB (LW570 only IR Assy)

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable 41&51PIN
3. LED driver / PSU
4. 15Pin (IR+Touch) Cable
5. SPK Cable
6. Local Dimming Cable

Interconnection - 3

42/47LV5500/T/W/G-ZA
42/47LV570G/S-ZA



[PCBs]

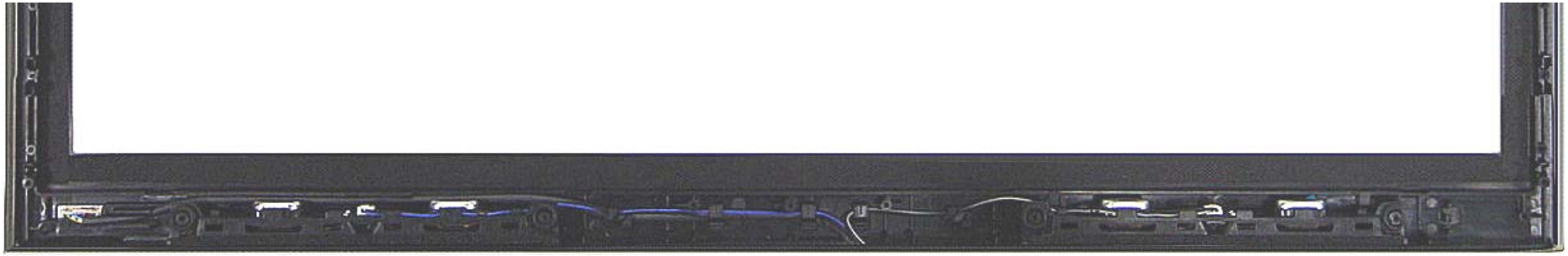
1. Main PCB
2. Power Board
3. Soft touch + IR Key PCB (LV570 only IR Assy)

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable 41&51PIN
3. LED driver / PSU
4. 15Pin (IR+Touch) Cable
5. SPK Cable
6. Local Dimming Cable

Same interconnection LW or LV serise in the 42”/47”

Interconnection – sub PCB(LV/LW55/57/65 serise)



3

IR & Soft touch Key PCB
(LV/LW570 only IR Assy)

SPK unit

Control key
(LV/LW570)

IR & Soft touch
Key PCB
(LV/LW570
only IR Assy)

4

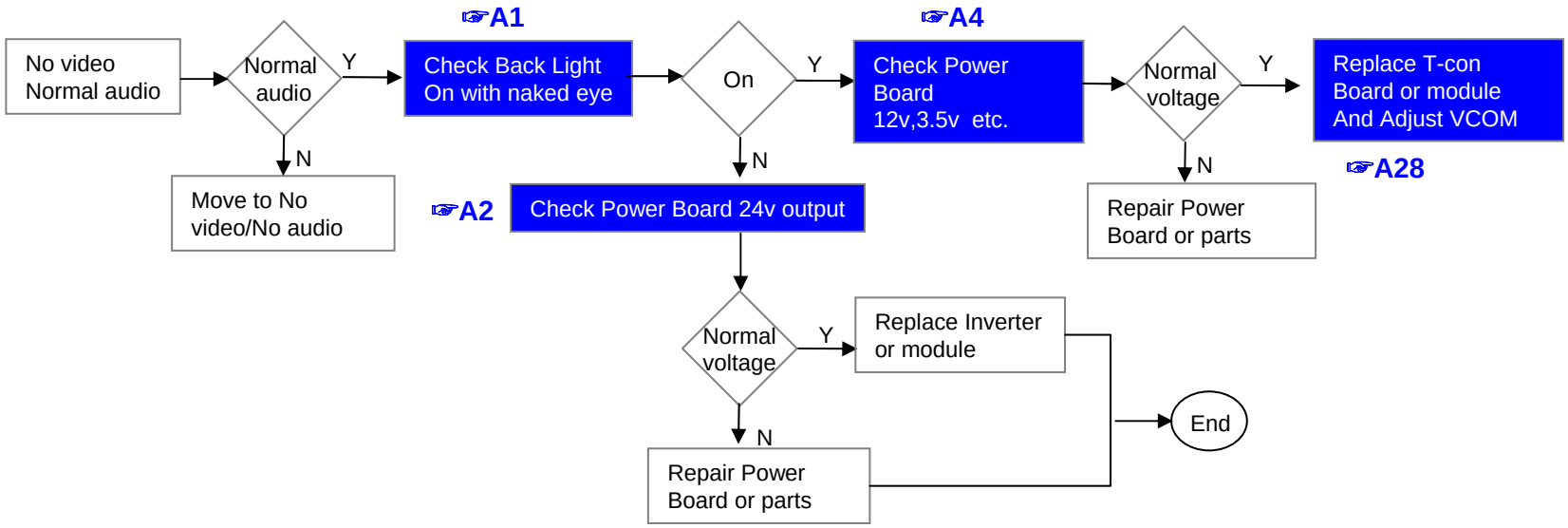
To Main

Contents of LCD TV Standard Repair Process

First of all, Check whether there is SVC Bulletin in GCSC System for these model.

Standard Repair Process					
LCD TV	Error symptom	A. Video error	Established date	2010. 12 .14	
		No video/ Normal audio	Revised date		1/14

First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, LVDS Cable,Speaker Cable,IR B/D Cable,,,)

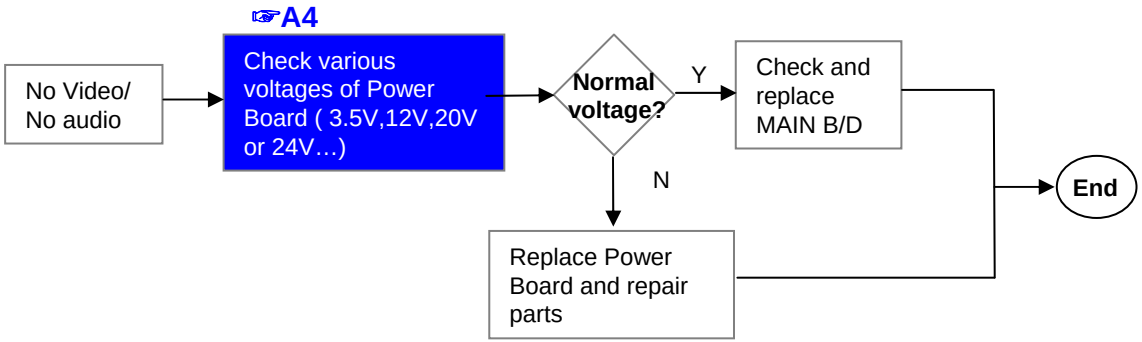


※Precaution ☞A7 & A3

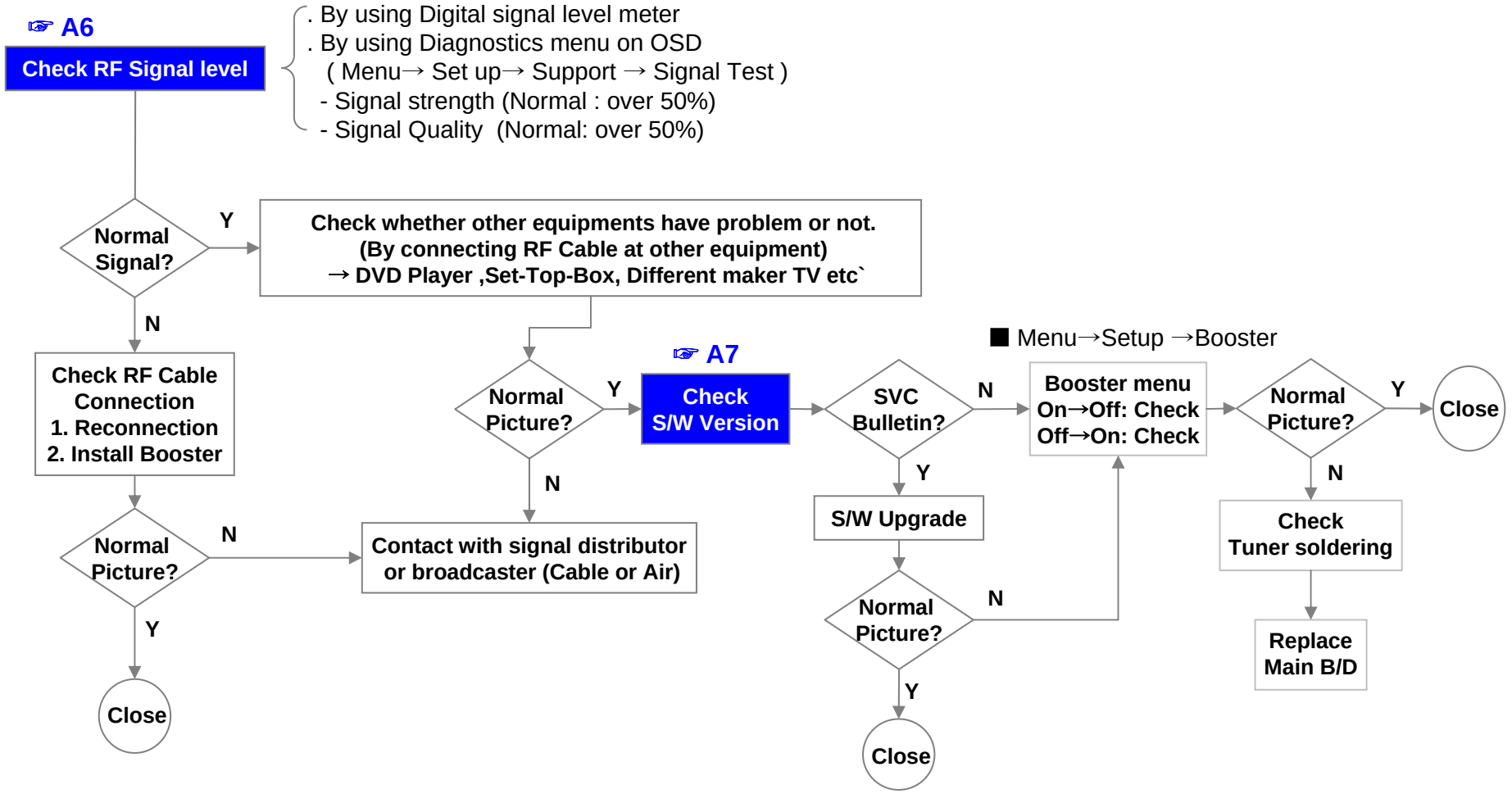
Always check & record S/W Version and White Balance value before replacing the Main Board → Replace Main Board → Re-enter White Balance value

Standard Repair Process

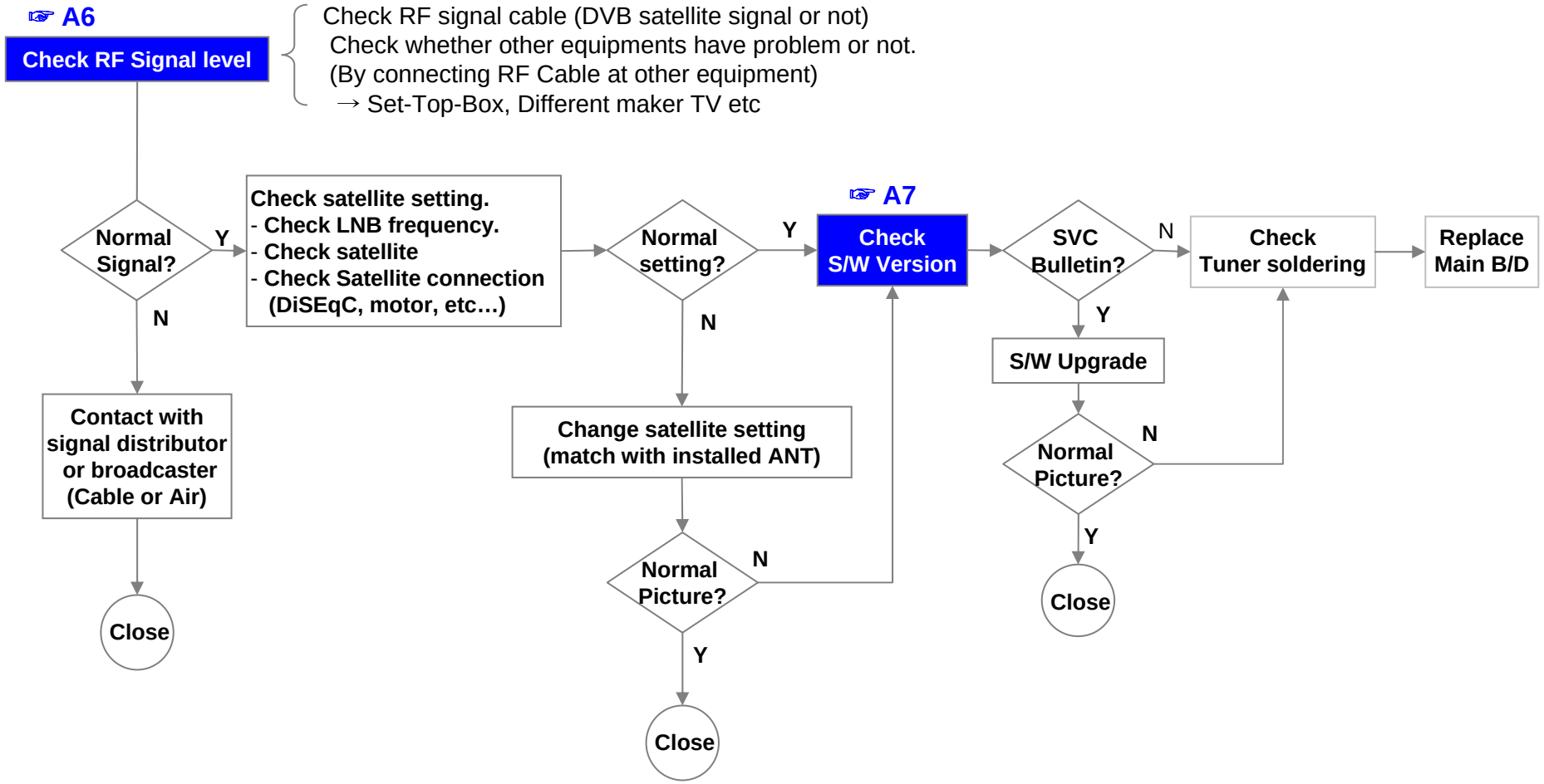
LCD TV	Error symptom	A. Video error	Established date	2010. 12 .14	
		No video/ No audio	Revised date		2/14

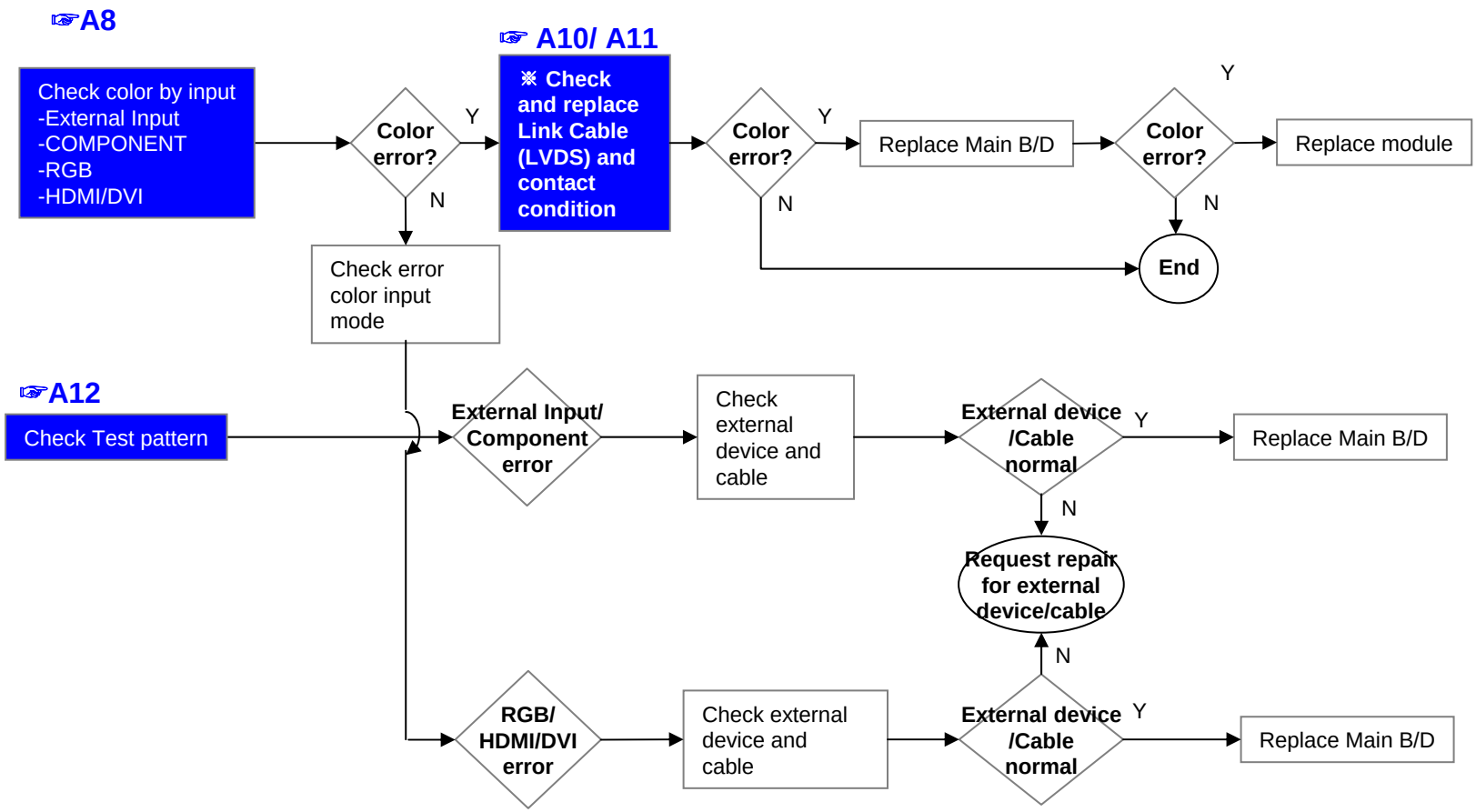


LCD TV	Error symptom	A. Picture Problem	Established date	2010. 12 .14	
		Picture broken/ Freezing	Revised date		3/14

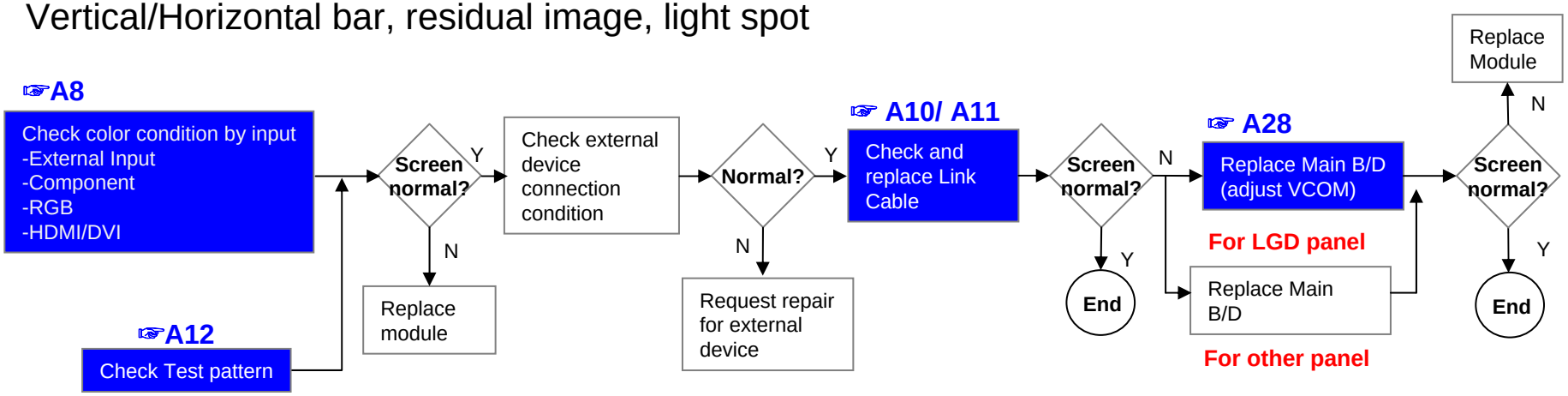


LCD TV	Error symptom	A. Picture Problem (DVB-S/S2)	Established date	2011. 01 .24	
		Tuning fail, Picture broken/ Freezing	Revised date		4/14

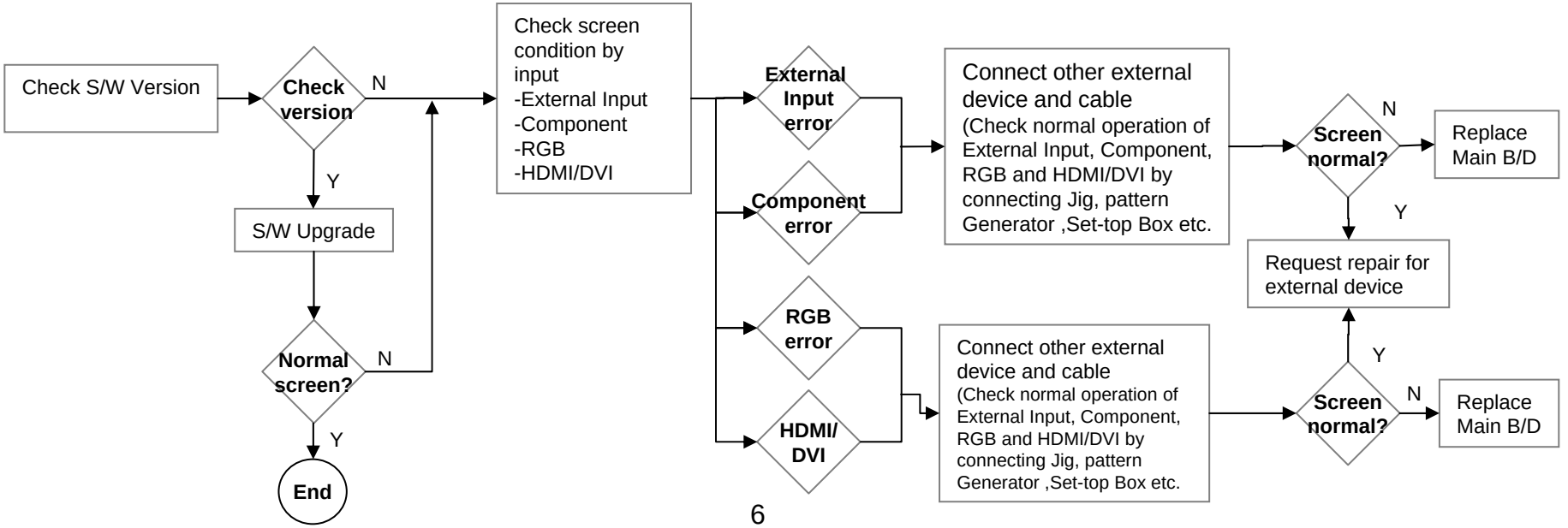




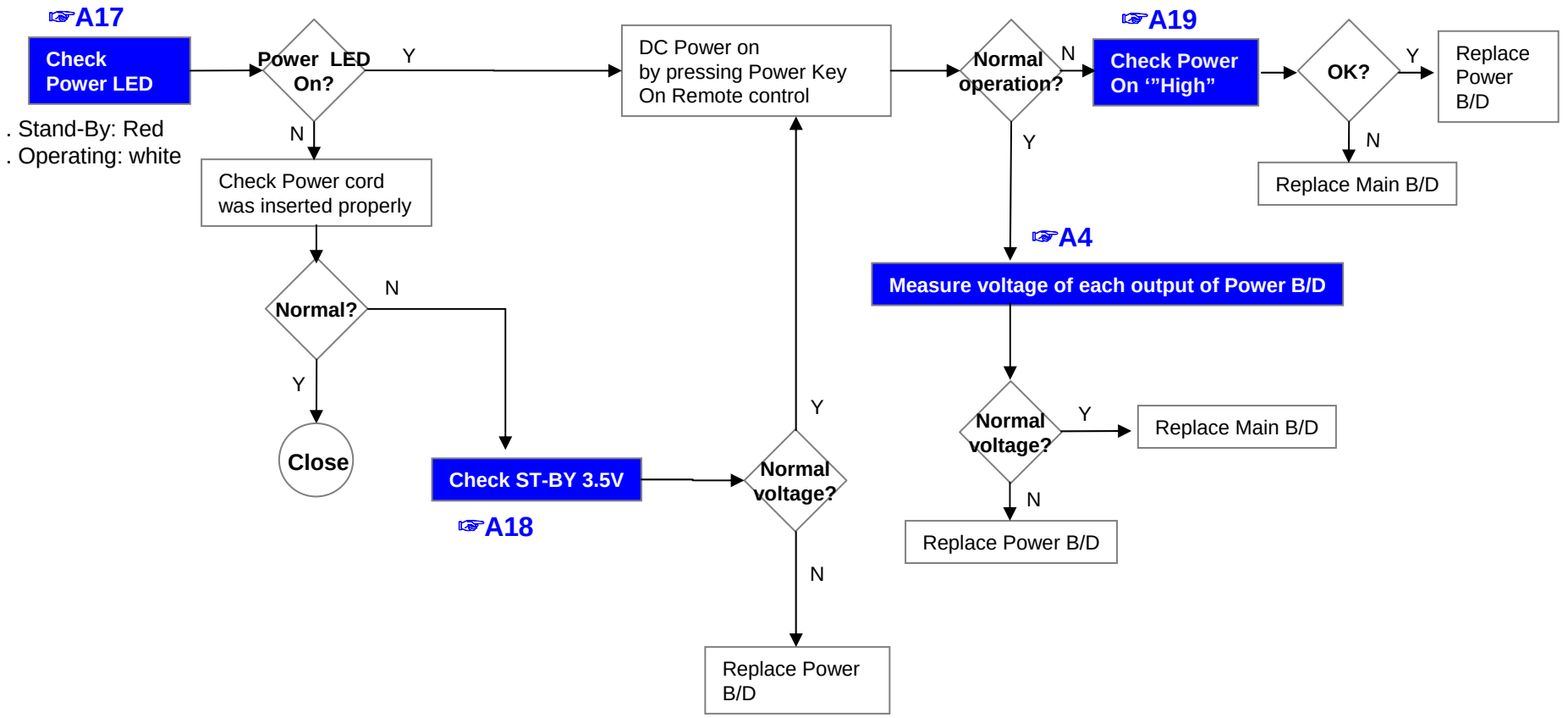
Vertical/Horizontal bar, residual image, light spot



External device screen error-Color error

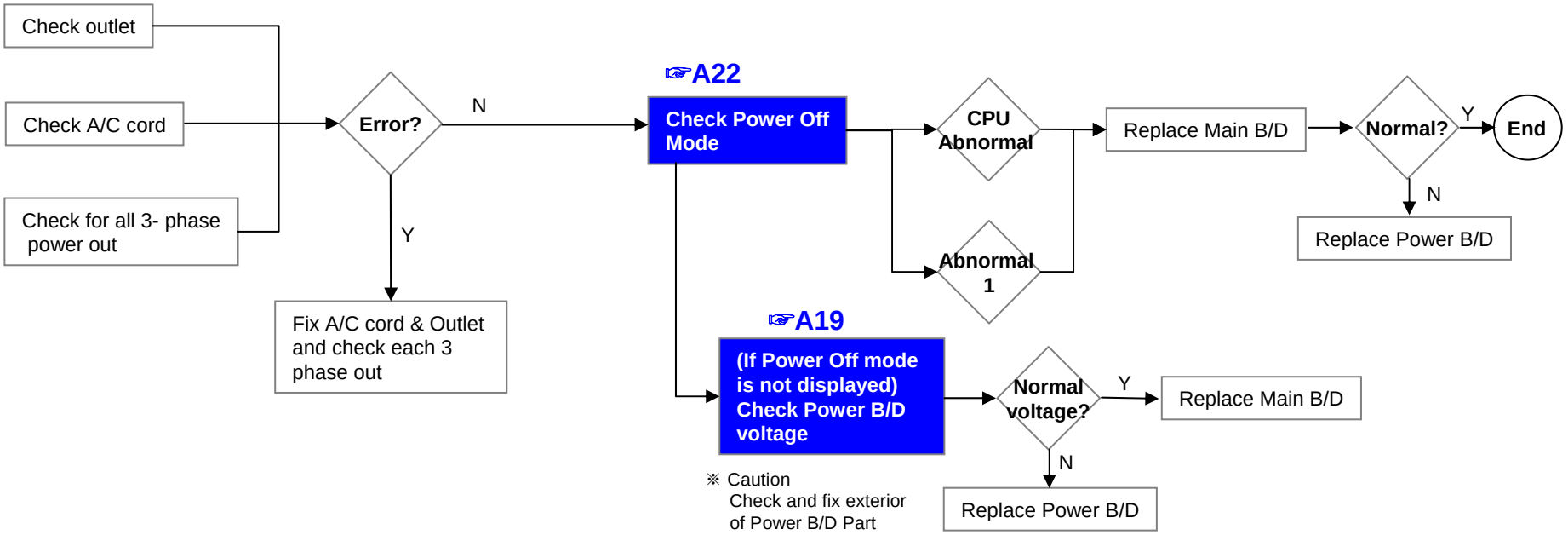


LCD TV	Error symptom	B. Power error	Established date	2010. 12 .14	
		No power	Revised date		7/14



Standard Repair Process

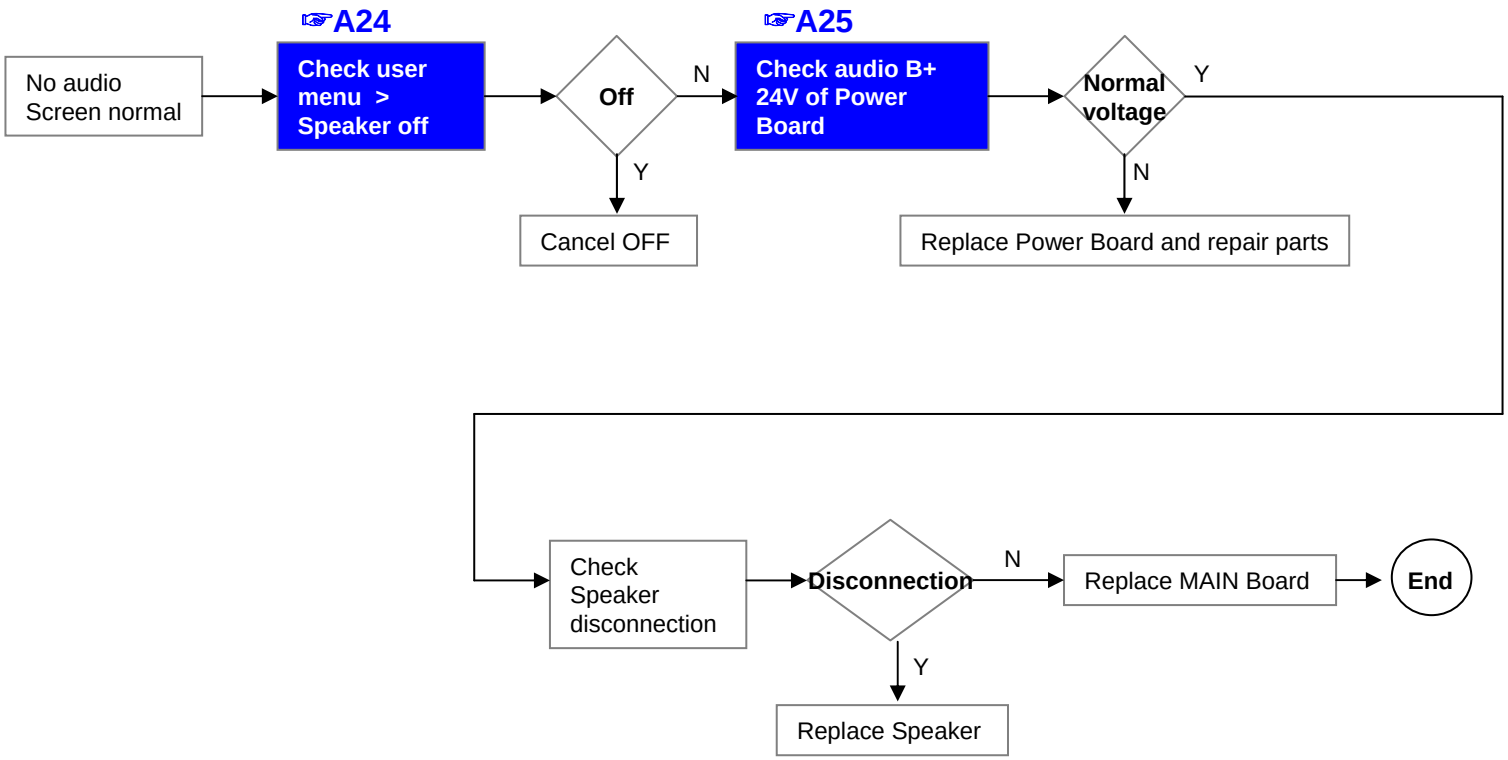
LCD TV	Error symptom	B. Power error	Established date	2010. 12 .14	
		Off when on, off while viewing, power auto on/off	Revised date		8/14



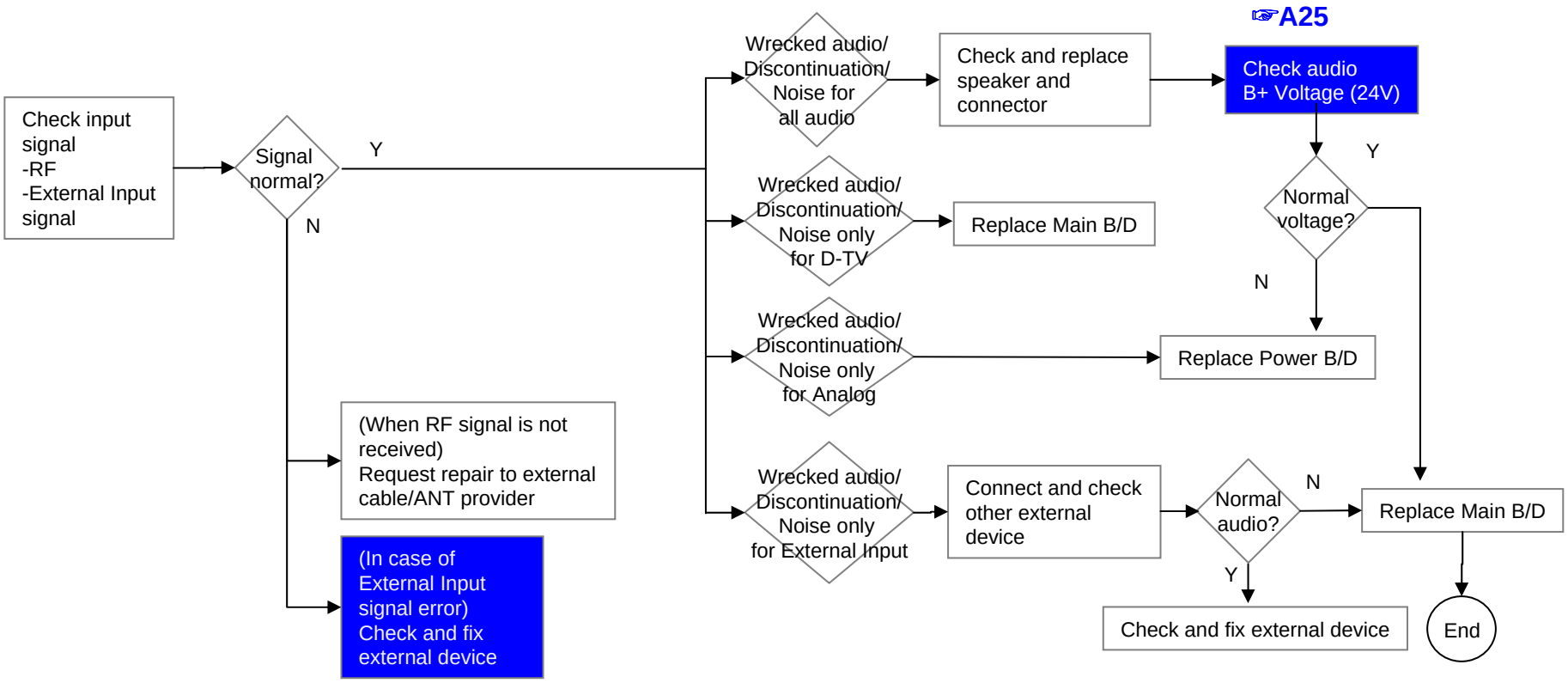
*** Please refer to the all cases which can be displayed on power off mode.**

Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_RESREC"	Power off by Reservated Record
	"POWEROFF_RECEND"	Power off by End of Recording
	"POWEROFF_SWDOWN"	Power off by S/W Download
	"POWEROFF_UNKNOWN"	Power off by unknown status except listed case
Abnormal	"POWEROFF_ABNORMAL1"	Power off by abnormal status except CPU trouble
	"POWEROFF_CPUABNORMAL"	Power off by CPU Abnormal

LCD TV	Error symptom	C. Audio error	Established date	2010. 12 .14	
		No audio/ Normal video	Revised date		9/14

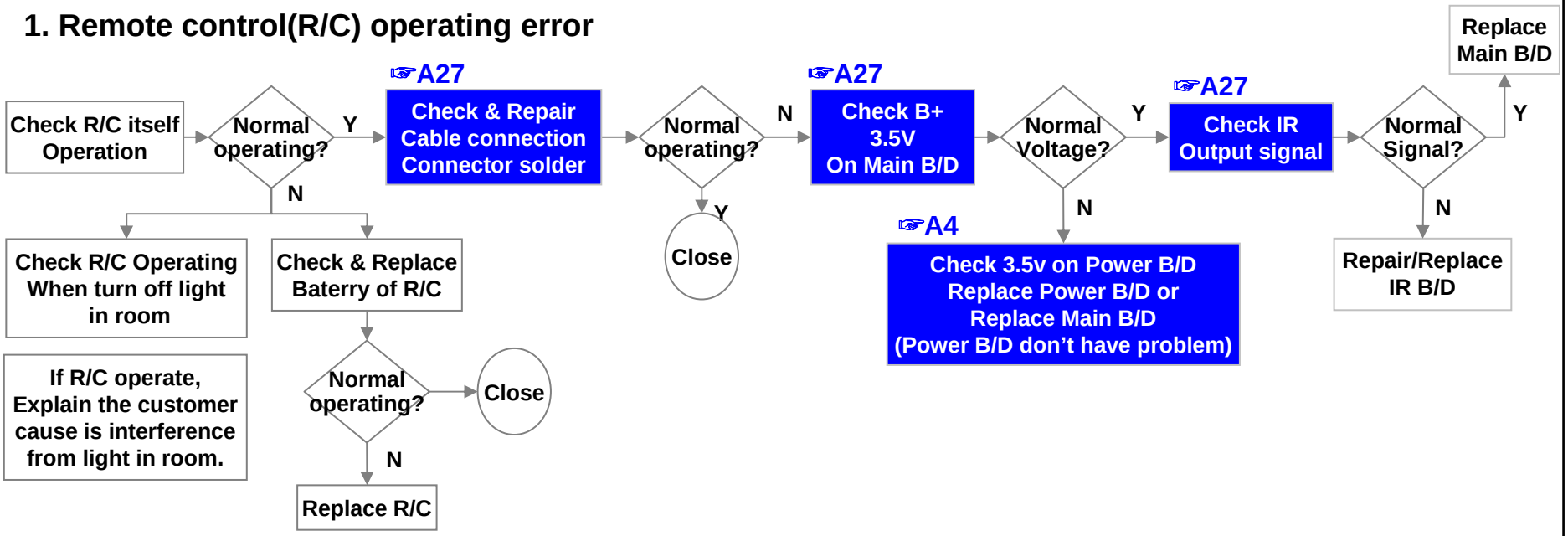


→ abnormal audio/discontinuation/noise is same after “Check input signal” compared to No audio

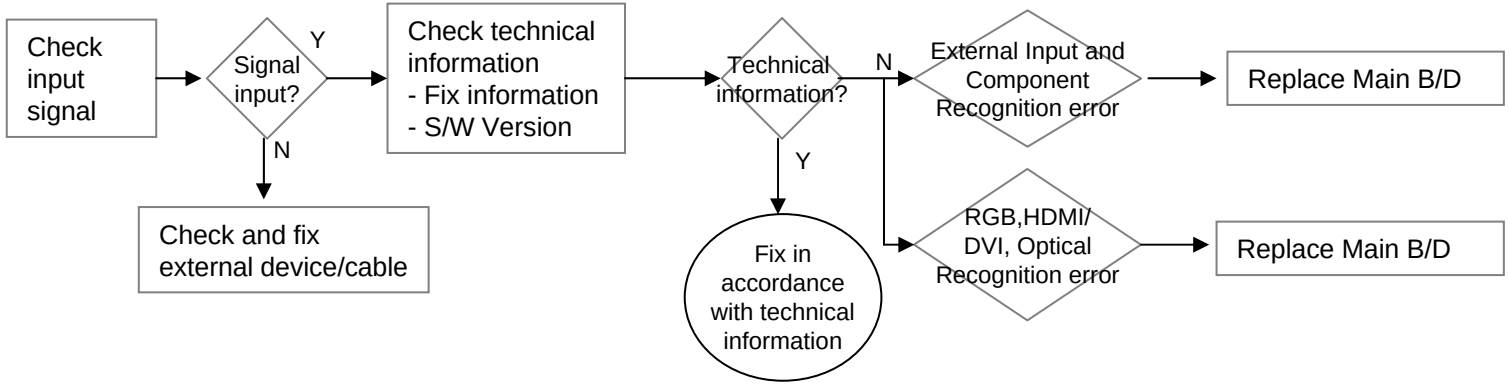


LCD TV	Error symptom	D. General Function Problem	Established date	2010. 12 .14	
		Remote control & Local switch checking	Revised date		11/14

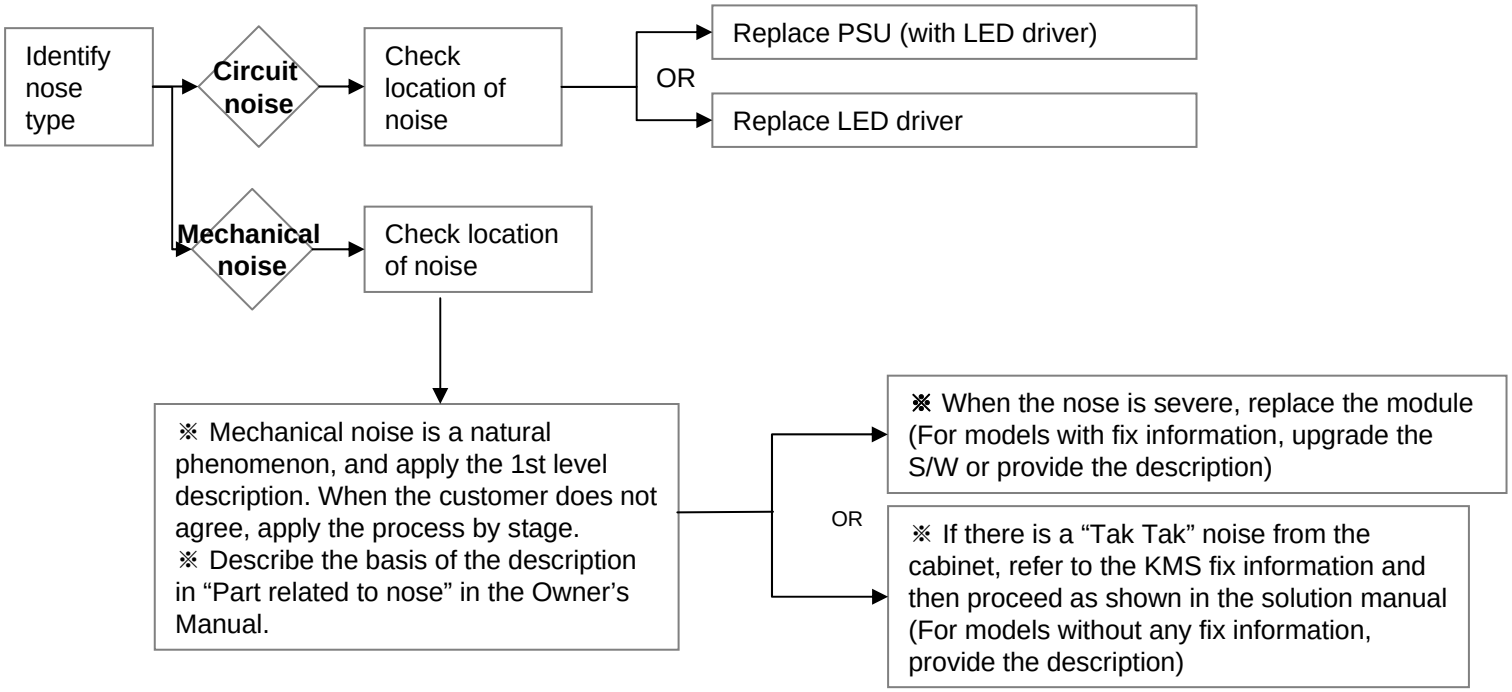
1. Remote control(R/C) operating error



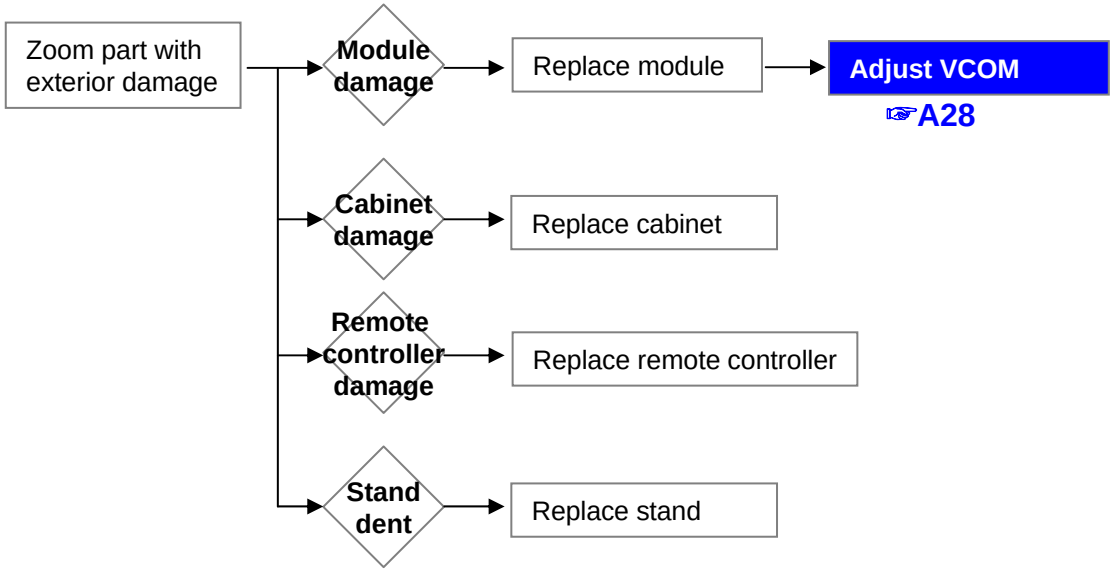
LCD TV	Error symptom	D. Function error	Established date	2010. 12 .14	
		External device recognition error	Revised date		12/14



LCD TV	Error symptom	E. Noise	Established date	2010. 12 .14	
		Circuit noise, mechanical noise	Revised date		13/14



LCD TV	Error symptom	F. Exterior defect	Established date	2010. 12 .14	
		Exterior defect	Revised date		14/14



Contents of LCD TV Standard Repair Process Detail Technical Manual

Continue to the next page

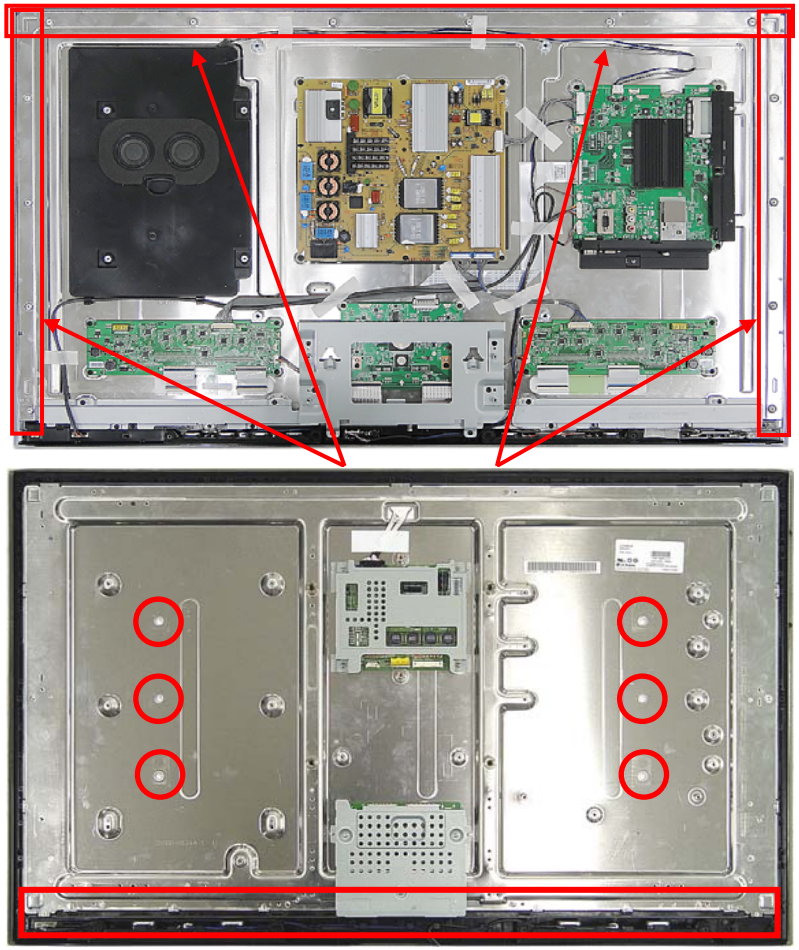
Contents of LCD TV Standard Repair Process Detail Technical Manual

Continued from previous page

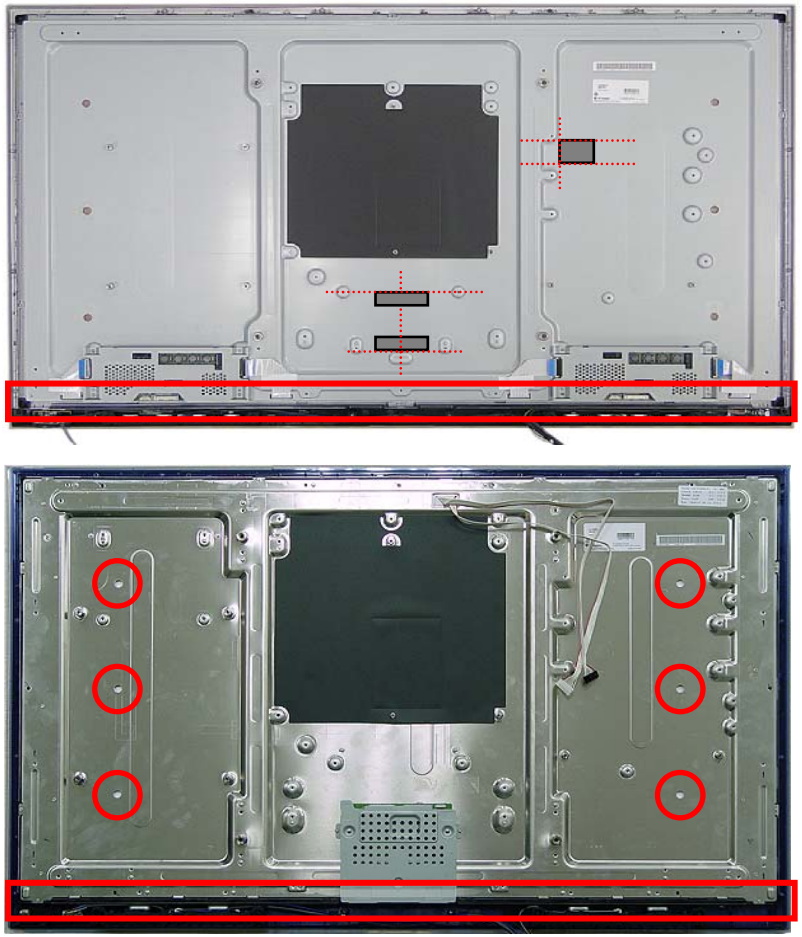
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2010. 12 .14	
	Content	Check LCD back light with naked eye	Revised date		A1

<XXLW950/XXLW980X MODELS>



<XXLW770X MODELS>



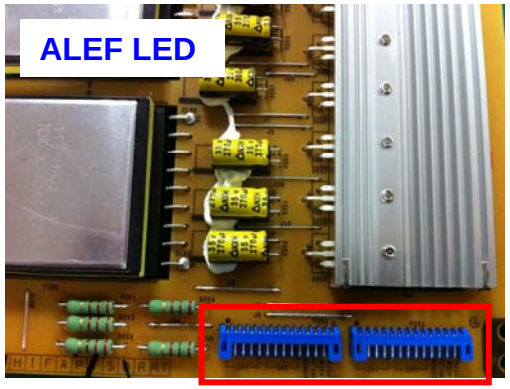
After turning on the power and disassembling the case, check with the naked eye, whether you can see light from module

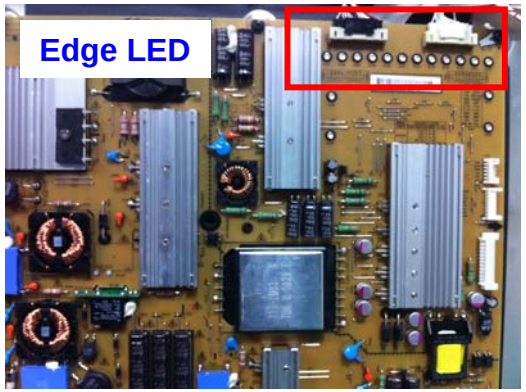
A1

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2010. 12 .14	
	Content	LED driver B+ 24V measuring method	Revised date		A2

Check the DC 24V, 12V, 3.5V and Inverter on





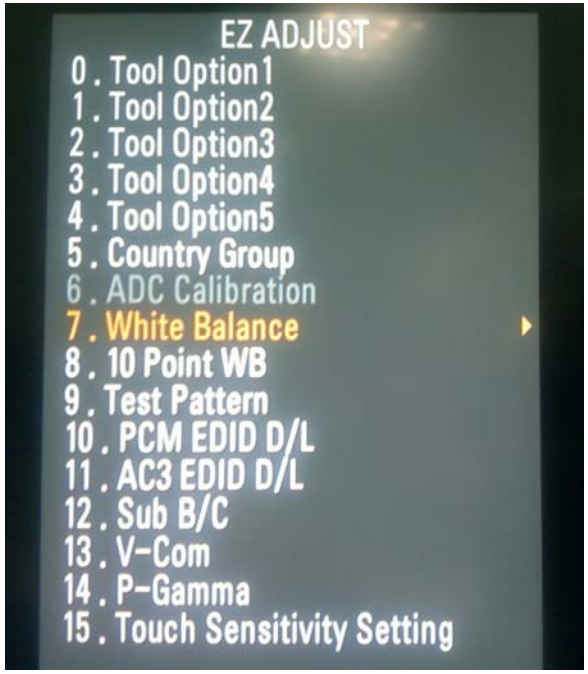
P202	
1~5	24V
6~10	GND
11	Error
12	Inverter ON
13	A-dim
14	P-dim

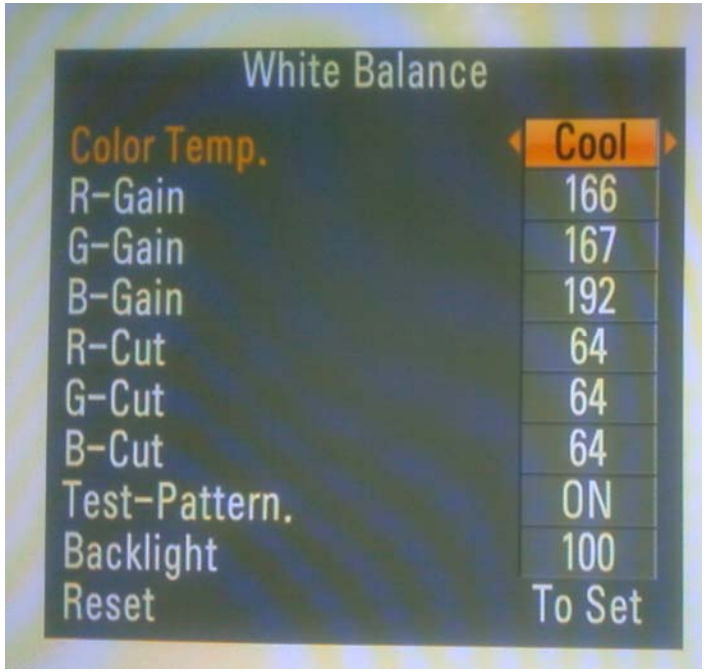
P203	
1~5	24V
6~10	GND
11	Error
12	Inverter ON
13	A-dim
14	P-dim

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2010. 12 .14	
	Content	Check White Balance value	Revised date		A3

<ALL MODELS>





Entry method

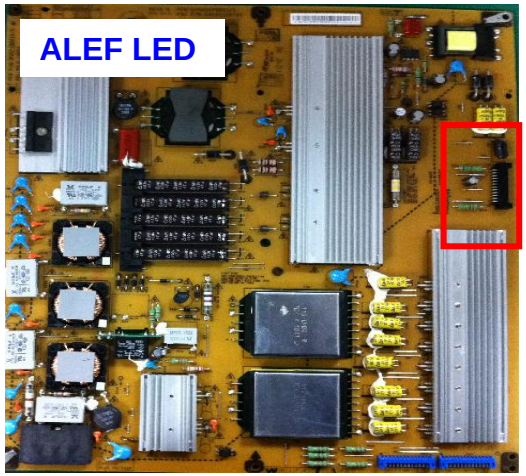
1. Press the ADJ button on the remote controller for adjustment.

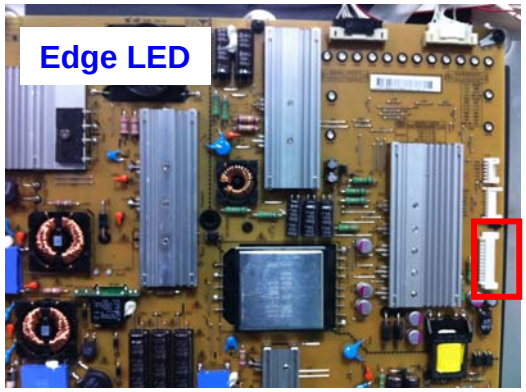
2. Enter into White Balance of item 7.

3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/ Audio	Established date	2010. 12 .14	
	Content	Power Board voltage measuring method	Revised date		A4





Check the DC 24V, 12V, 3.5V.

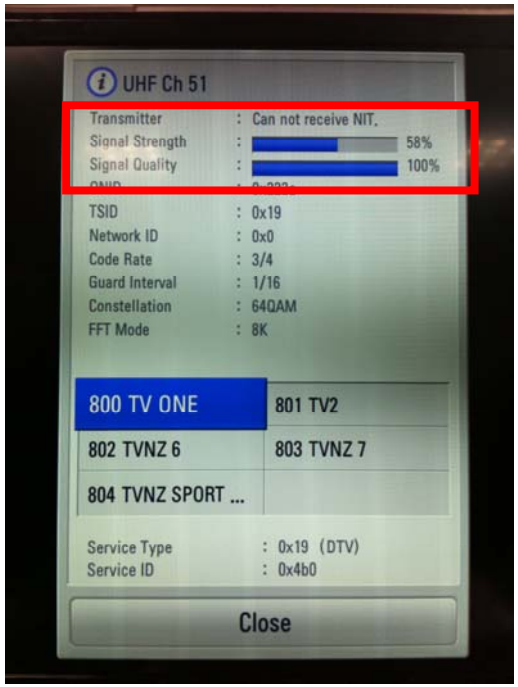
24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2010. 12 .14	
	Content	TUNER input signal strength checking method	Revised date		A6

<ALL MODELS>

MENU -→ Set up → support -→ signal test -→ select channel



When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)

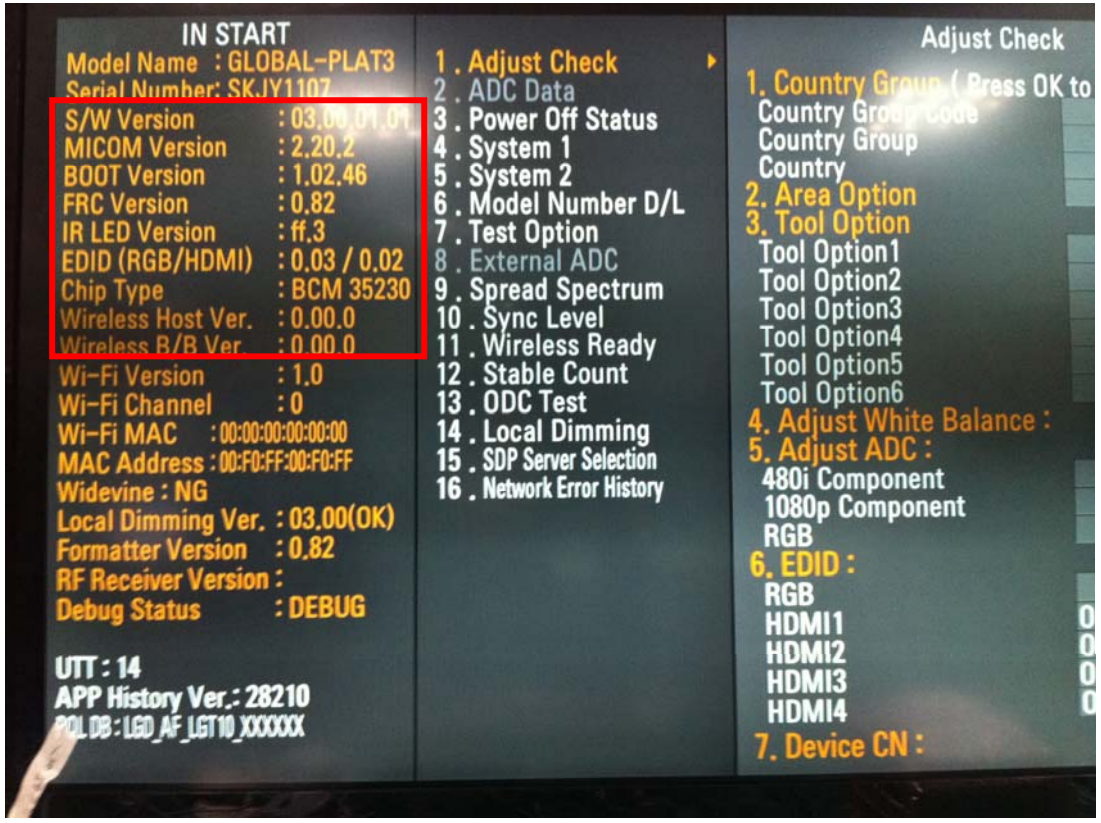
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2010. 12 .14	
	Content	LCD-TV Version checking method	Revised date		A7

<ALL MODELS>

1. Checking method for remote controller for adjustment

Version

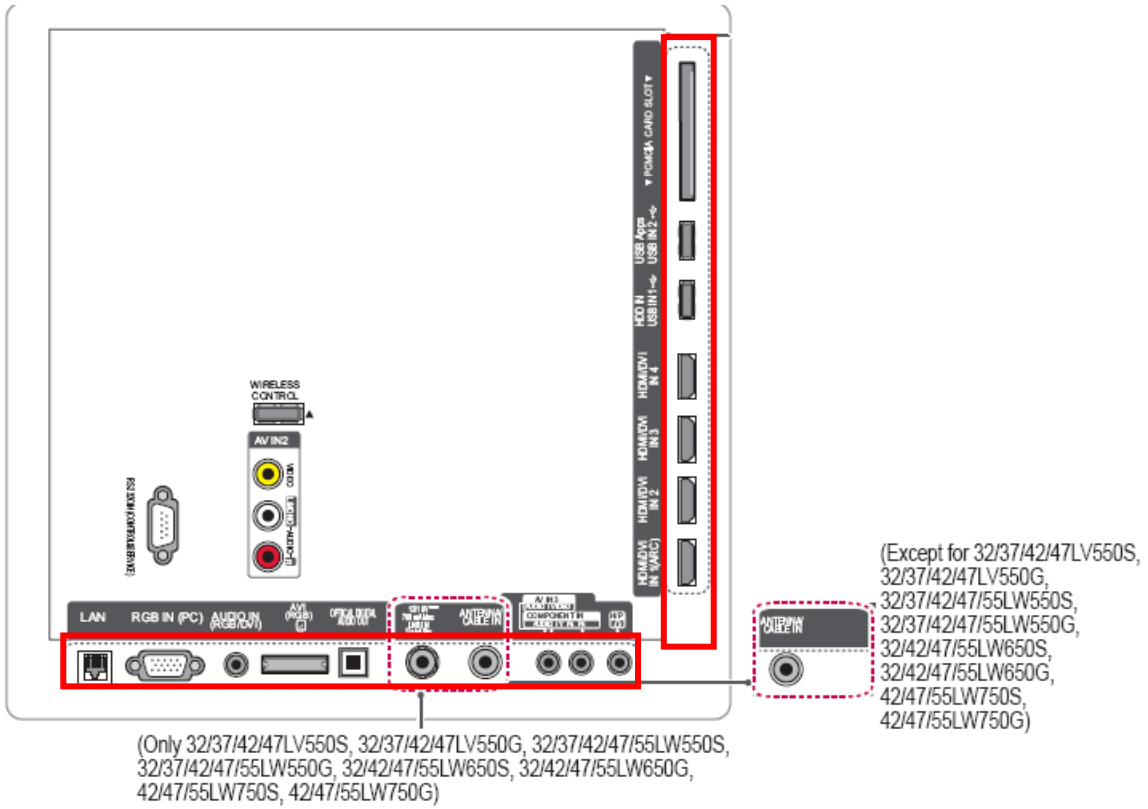


Press the IN-START with the remote controller for adjustment

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date	2010. 12 .14	
	Content	LCD TV connection diagram (1)	Revised date		A8

<ALL MODELS>

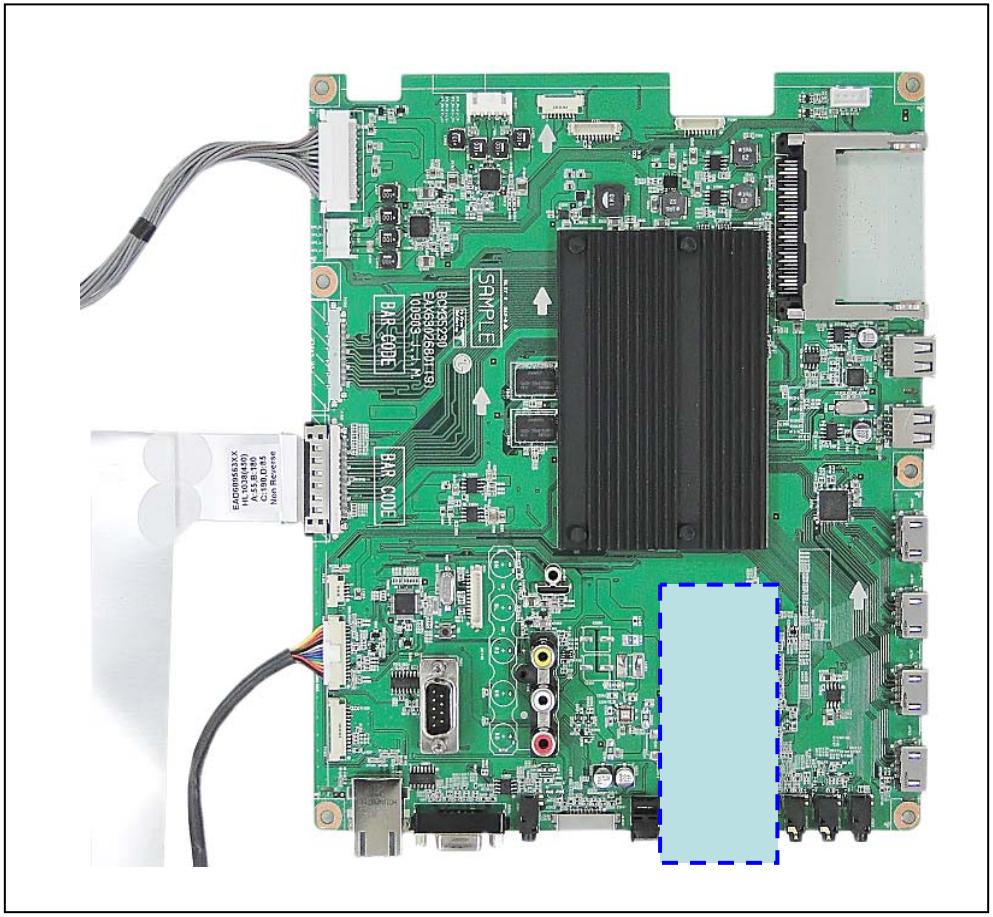


As the part connecting to the external input, check the screen condition by signal

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2010. 12 .14	
	Content	TUNER checking part	Revised date		A9

<ALL MODELS>

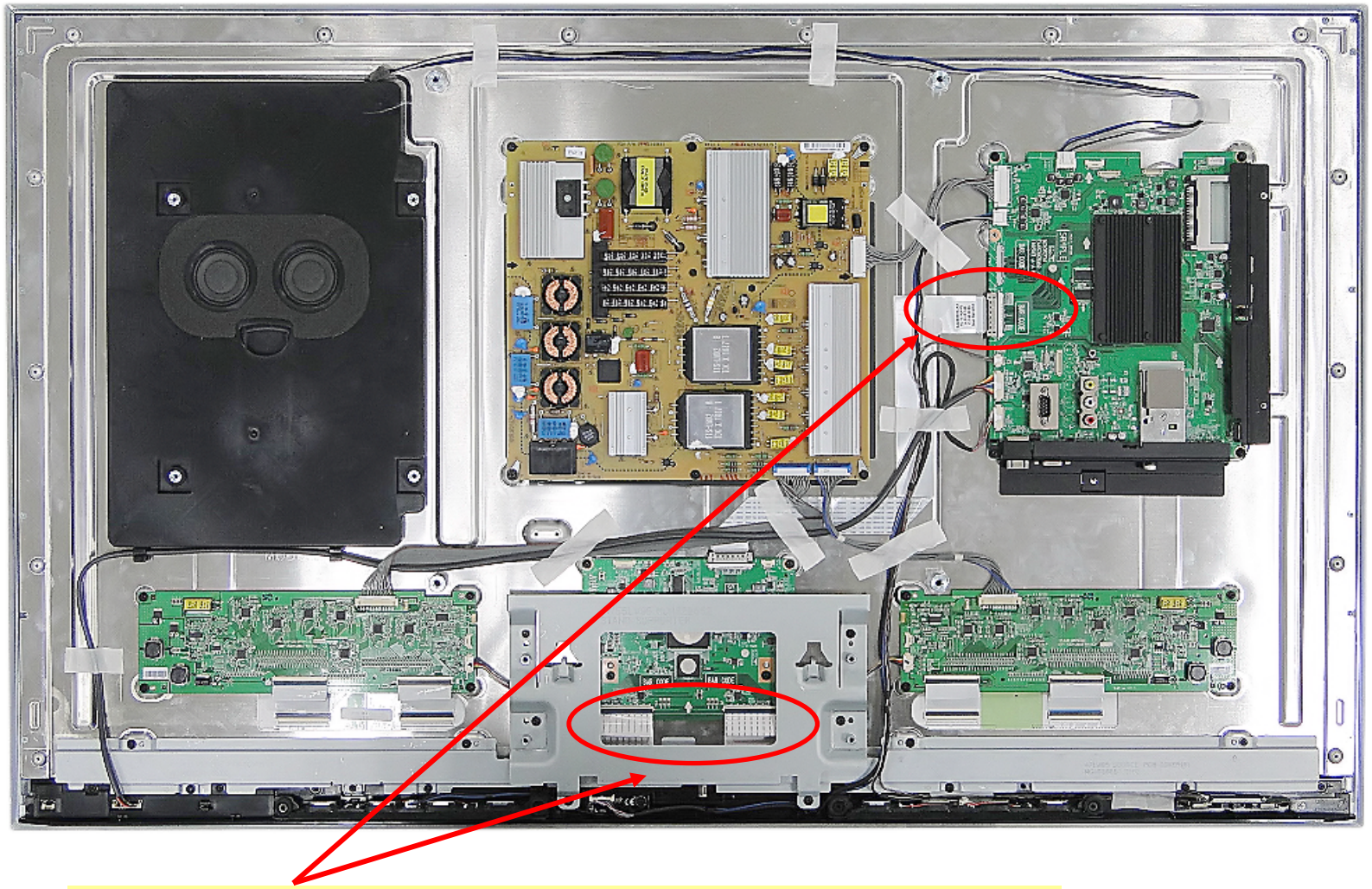


Checking method:
1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2010. 12 .14	
	Content	Check Link Cable (LVDS) reconnection condition	Revised date		A10

<ALL MODELS>



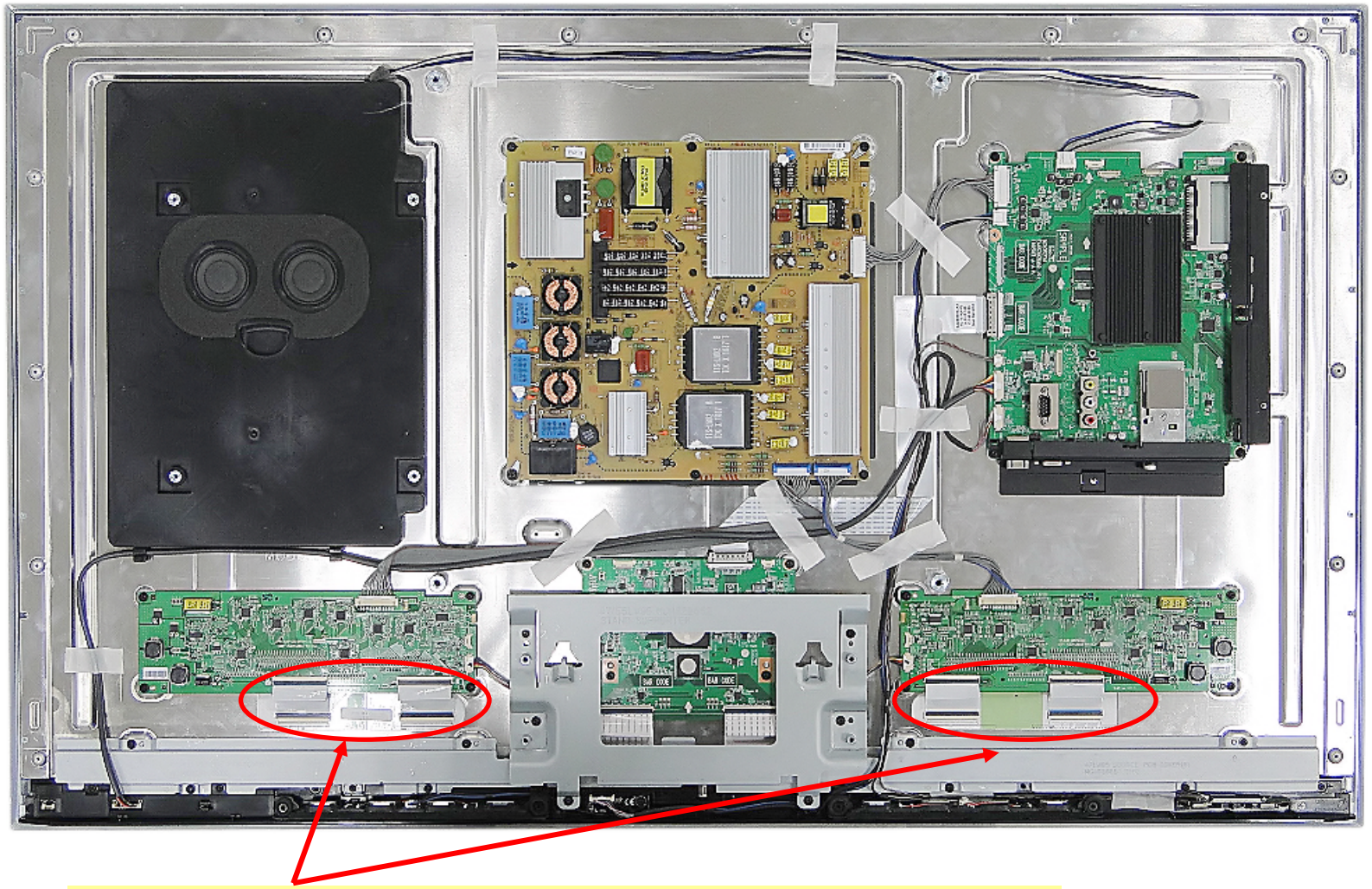
Check the contact condition of the Link Cable, especially dust or mis insertion.

A10

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2010. 12 .14	
	Content	Check Link Cable reconnection condition	Revised date		A11

<ALL MODELS>

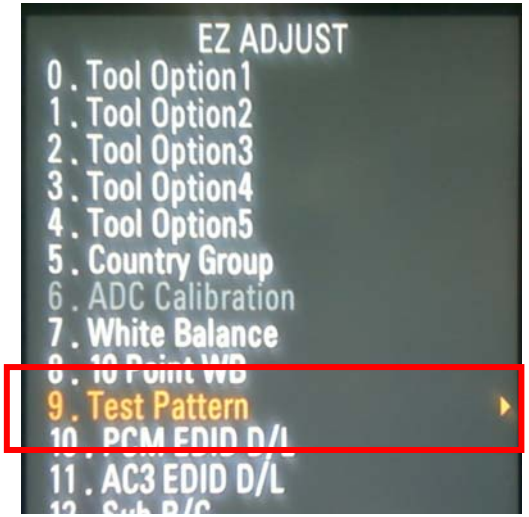


Check the contact condition of the Link Cable, especially dust or mis insertion.

A11

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2010. 12 .14	
	Content	Adjustment Test pattern - ADJ Key	Revised date		A12

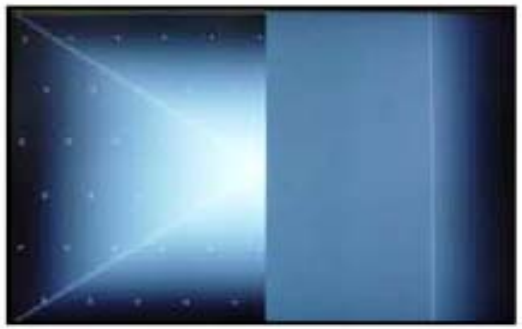


You can view 6 types of patterns using the ADJ Key

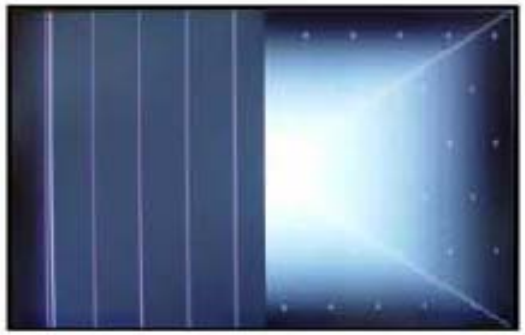
Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
4.Video error (Classification of MODULE or Main-B/D!)

Appendix : Exchange T-Con Board (1)

Solder defect, CNT Broken

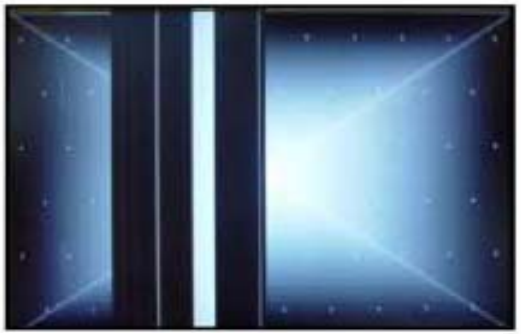


Solder defect, CNT Broken

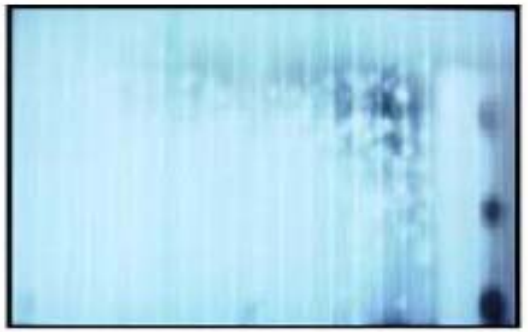


Solder defect, CNT Broken

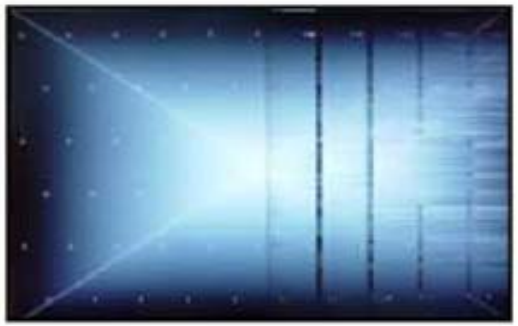
Solder defect, CNT Broken



Solder defect, CNT Broken



Abnormal Power Section

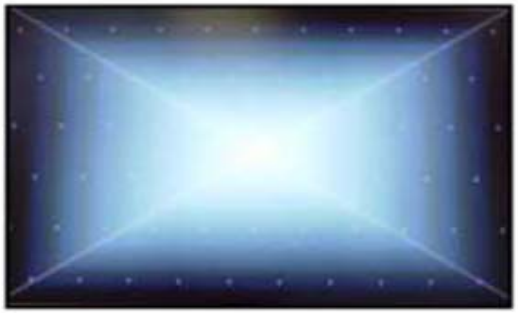


Solder defect, Short/Crack

Abnormal Power Section

Solder defect, Short/Crack

Appendix : Exchange T-Con Board (2)



Abnormal Power Section

Abnormal Power Section

Solder defect, Short/Crack

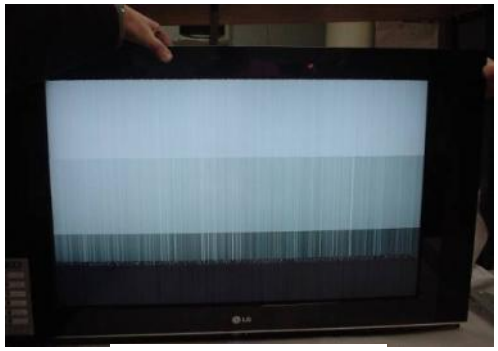
Solder defect, Short/Crack

Fuse Open, Abnormal power section

Abnormal Display

GRADATION

Noise

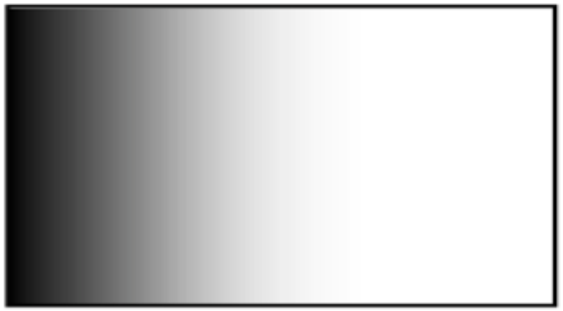


GRADATION

Appendix : Exchange PSU(LED driver)

No Light

Dim Light



Dim Light

Dim Light

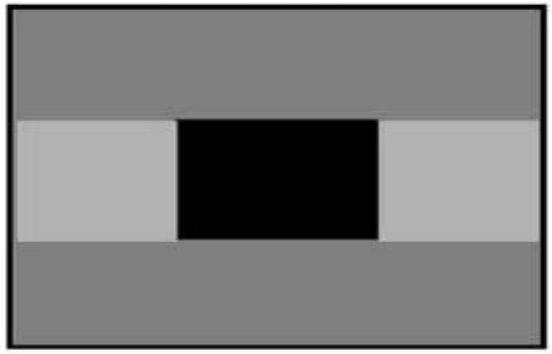
No picture/Sound Ok

Appendix : Exchange the Module (1)

Panel Mura, Light leakage

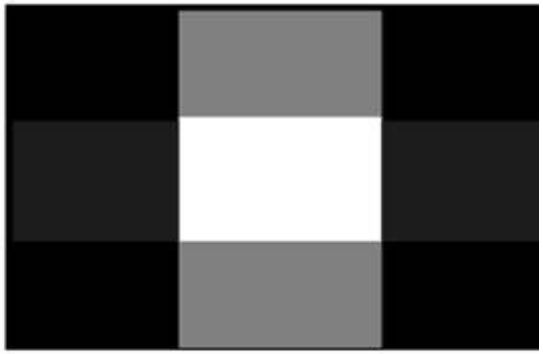
Panel Mura, Light leakage

Press damage



Crosstalk

Press damage



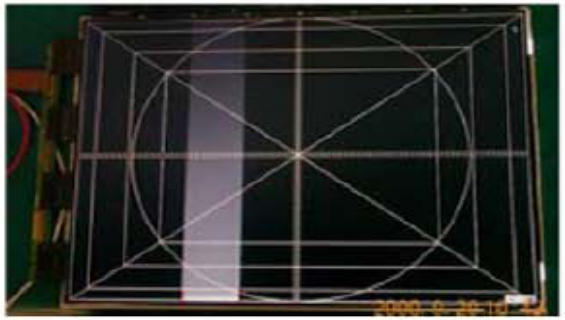
Crosstalk

Press damage

Un-repairable Cases

In this case please exchange the module.

Appendix : Exchange the Module (2)



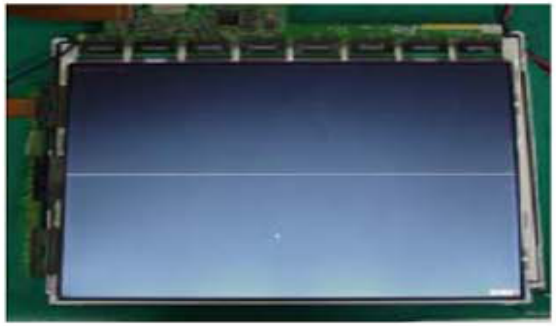
Vertical Block
Source TAB IC Defect

Vertical Line
Source TAB IC Defect

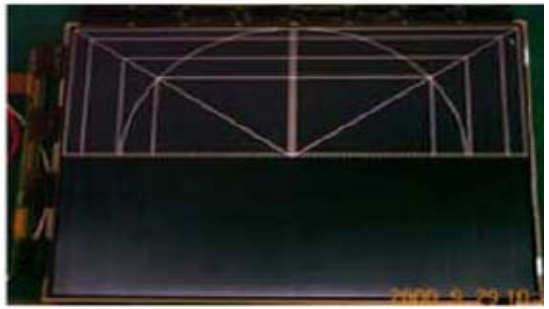
Vertical Block
Source TAB IC Defect

Horizontal Block
Gate TAB IC Defect

Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect



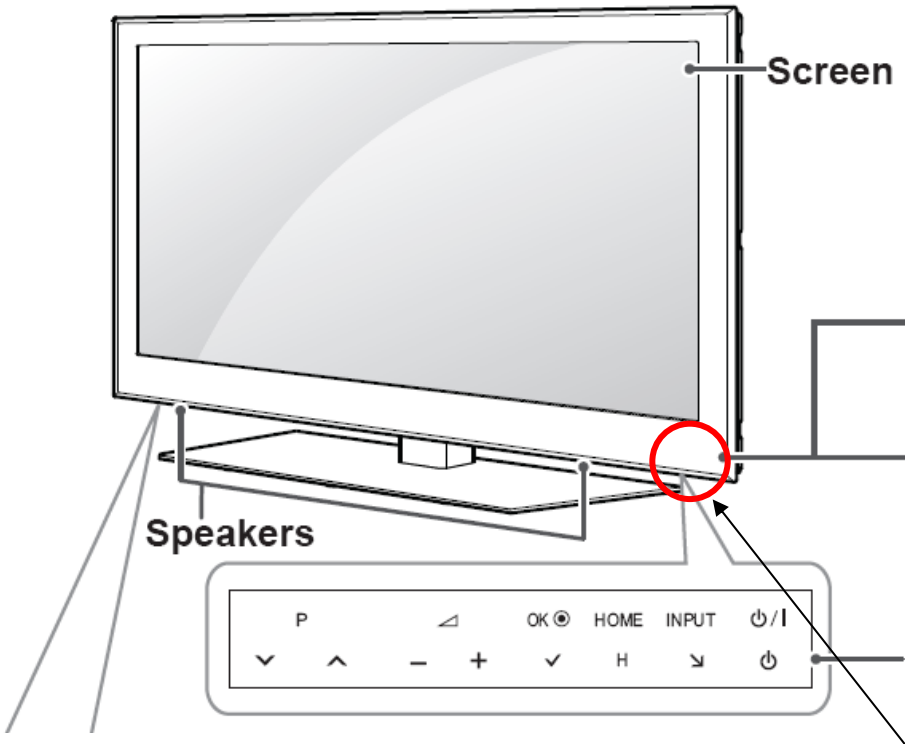
Horizontal Block
Gate TAB IC Defect

Un-repairable Cases

In this case please exchange the module.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Check front display LED	Revised date		A17



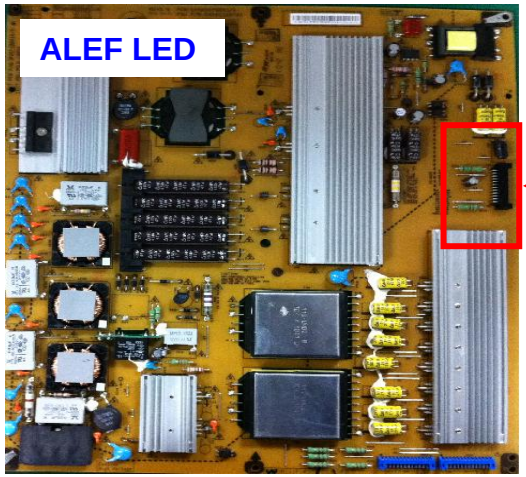
Front LED control :
Menu → Option → Power Indicator → Standby light ON

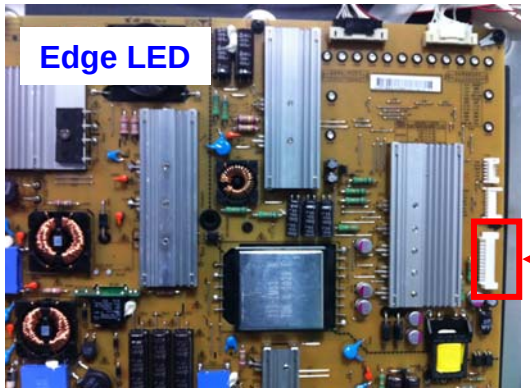
ST-BY condition: Red
Power ON condition: white

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Check power input voltage and ST-BY 5V	Revised date		A18

For ’10 models, there is no voltage out for st-by purpose.
When st-by, only 3.5V is normally on.



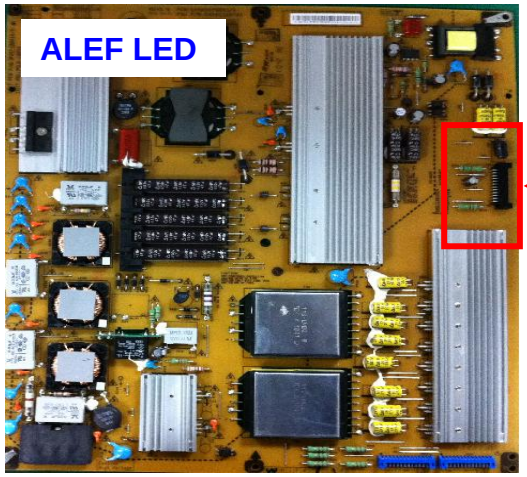


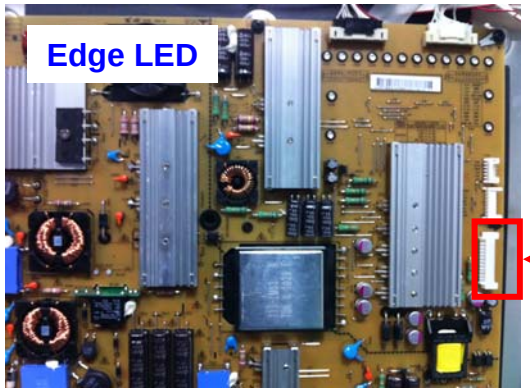
Check the DC 20V/24V, 12V, 3.5V.

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Checking method when power is ON	Revised date		A19





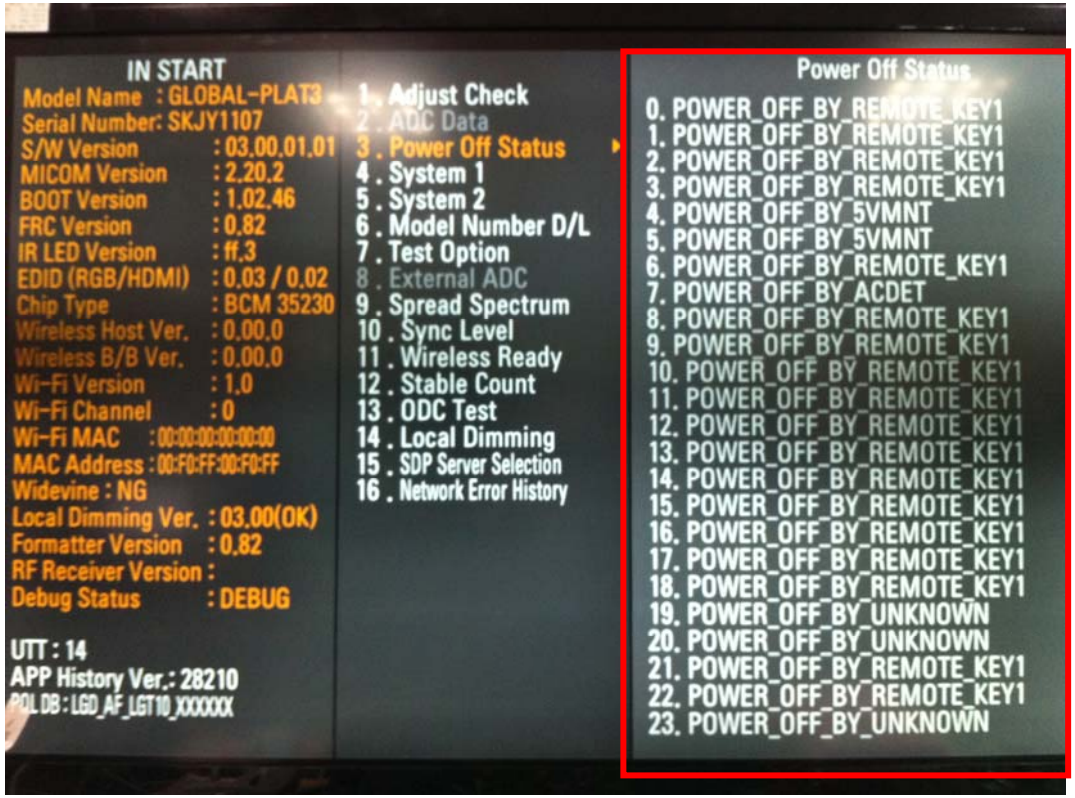
Check “power on” pin is high

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _Off when on, off whiling viewing	Established date	2010. 12 .14	
	Content	POWER OFF MODE checking method	Revised date		A22

<ALL MODELS>



Entry method

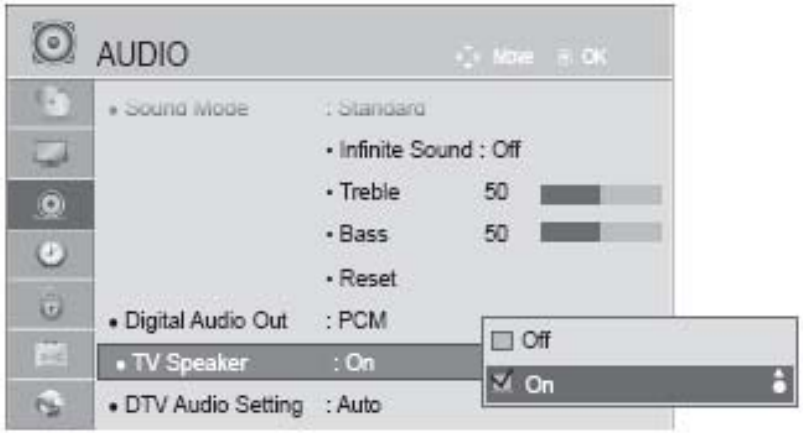
1. Press the IN-START button of the remote controller for adjustment

2. Check the entry into adjustment item 3

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2010. 12 .14	
	Content	Checking method in menu when there is no audio	Revised date		A24

<ALL MODELS>



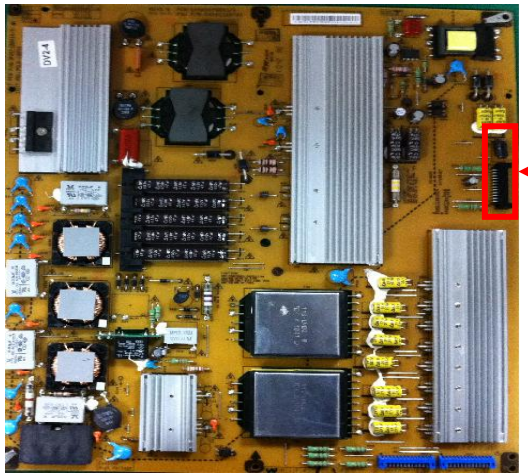
Checking method

1. Press the MENU button on the remote controller
2. Select the AUDIO function of the Menu
3. Select TV Speaker from Off to On

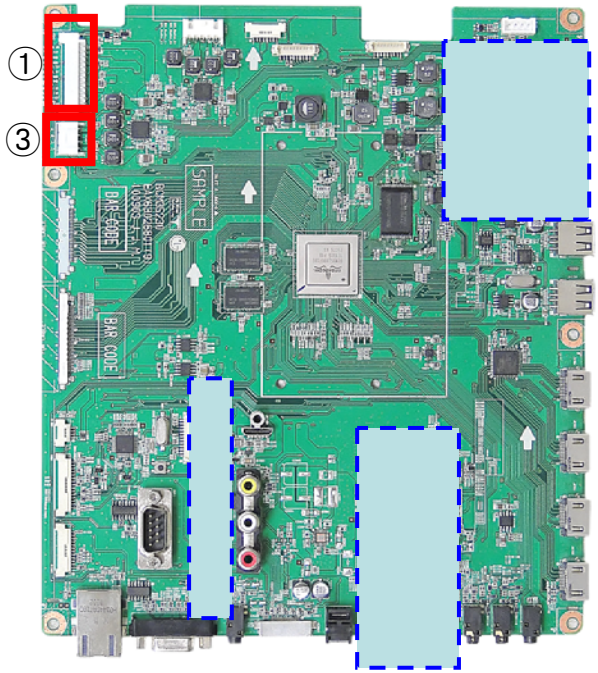
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2010. 12 .14	
	Content	Voltage and speaker checking method when there is no audio	Revised date		A25

<ALL MODELS>



24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out



Checking order when there is no audio

① Check the contact condition of or 24V connector of Main Board

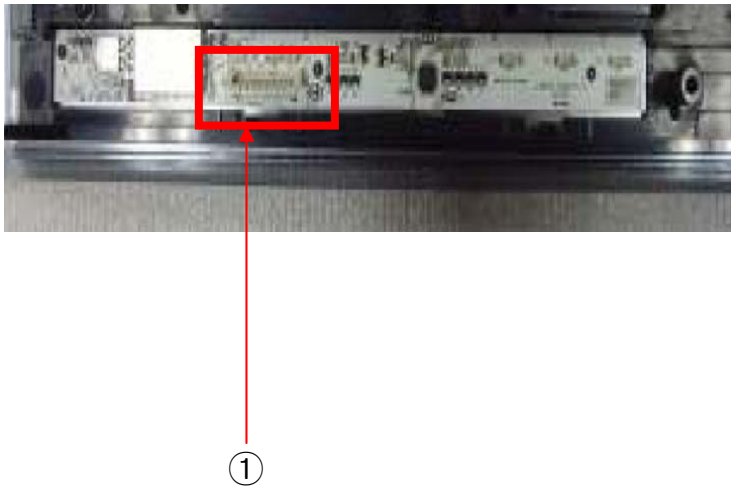
② Measure the 24V input voltage supplied from Power Board
(If there is no input voltage, remove and check the connector)

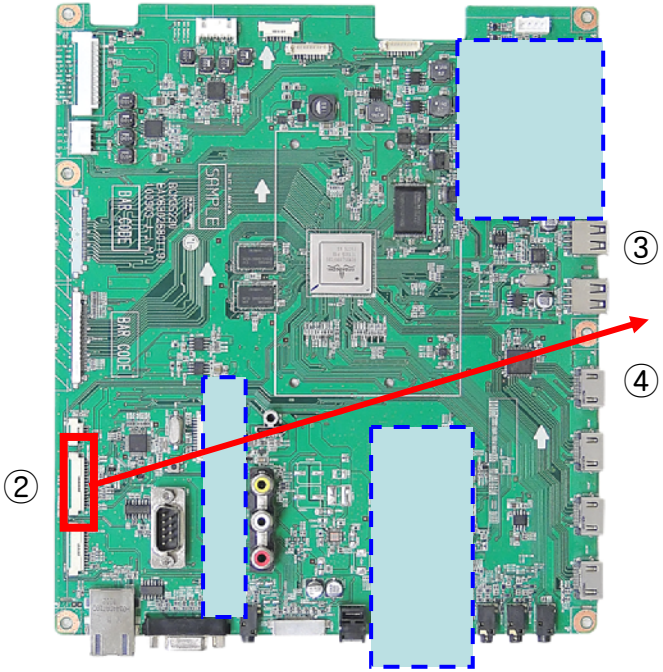
③ Connect the tester RX1 to the speaker terminal and if you hear the Chik Chik sound when you touch the GND and output terminal, the speaker is normal.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. Function error_ No response in remote controller, key error	Established date	2010. 12 .14	
	Content	Remote controller operation checking method	Revised date		A27

<ALL MODELS>





P8200	
1	SCL
2	SDA
3	GND
4	KEY1
5	KEY2
6	St 3.5V
7	GND
8	LED_B/logo_PWM
9	IR
10	GND
11	3.3V_Normal
12	LED_R/BUZZ
13	GND
14	ST_SCL
15	ST_SDA

Checking order

1, 2. Check IR cable condition between IR & Main board.
3. Check the st-by 3.3V on the terminal 6.
4. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. VCOM Adjustment	Established date	2010. 12 .14	
	Content	Sequence of the Vcom adjustment	Revised date		A28

1. Case
■ LCD module change
■ T-Con board change

2. Equipment
■ Service Remote controller

3. Adjust sequence
■ Press the ‘adj’ key
■ select V-COM
■ As pushing the right or the left button on the remote controller, And find the V-COM value Which is no or minimized the Flicker.
(If there is no flicker at default value, Press the exit key and finish the VCOM adjustment.)
■ Push the OK key to store the value. Then the message “Saving OK” is pop.
■ Press the exit key to finish V-COM adjustment.